UNITED STATES ARMY

JUNE 1972

AVIATION DIGEST

UNITED STATES ARMY AVIATION DIGEST

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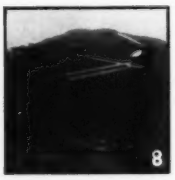

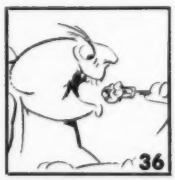

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ABOUT THE COVER

A wounded man is placed aboard an OH-13 helicopter to be evacuated to a rear area hospital during the Korean War. Colonel Hubert D. Gaddis, who evacuated the 10,000th wounded soldier in Korea, comments on the back cover on air medical evacuation developments and outlooks

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

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VIEWS FROM READERS

Sir:

Could you furnish me a list of Aero Clubs operated by the U. S. Army in Europe, or information as to where I may obtain a list.

Thank you for your consideration.

John E. LaChappelle
Tulsa, OK 74135

• The DIGEST does not maintain information on Aero Clubs; however, you should be able to obtain such a list by contacting the Office of the Chief of Information, Headquarters, Department of the Army, Washington, D. C. 20310.

★★★

Sir:

I am writing to congratulate Captain Meyer on his article "Low Level Proficiency." It is most assuredly a timely topic and one which needs all Army aviators' immediate attention.

I must, however, take this opportunity to "thought-smith" some of the author's ideas.

First, I am afraid that many of us in aviation do not know the difference between low level flight and nap-of-the-earth (NOE) flight.

With regards to low level flight, most folks define it as 50 feet above the highest obstacle at cruise air speed.

Speaking of NOE, we in Armor define it as 0–50 feet at 0–40 knots. In essence, we've brought our helicopters back into the true ground environment. At 3 feet you can surely use both terrain and vegetation to conceal your movements.

I might quickly add that our accident rate decreases proportionately to the decrease in air speed and altitude.

Concerning NOE navigation, the primary training the aviator needs is basic mapreading. "When in the ground environment navigate as the ground forces do." Every aircraft has two bodies, one flies and one navigates. A lot of us will be surprised how easy it is and with nothing more than an inexpensive and cost effective map.

MAJ James W. Bradin
Ft. Knox, KY 40121

★★★

Sir:

I desire to obtain two free copies of your fine magazine U. S. ARMY AVIATION DIGEST each month.

As a USAF aerospace physiologist I have had an opportunity to read your magazine at Wright-Patterson AFB, OH, each month. Now here in Vietnam it is not available to me! I desire to use the articles on aviation medicine in implementing a physiological training program for the Vietnamese Air Force.

Thanks.

LTC Giles W. Hall
Physiologist Advisor
Air Force Advisory Group-MACV
APO 96307

• Your complimentary letter is most appreciated and we wish it were possible to place you on distribution of the U. S. ARMY AVIATION DIGEST at this level. However, the DIGEST is an official Department of the Army magazine with distribution being handled in Washington. In order for you to receive our magazine it will be necessary for you to conform with the instructions on the attached sheet [see page 20, February 1972 DIGEST].

The DIGEST does have some extra copies available of back issues and when these are requested we are happy to send them. If you can advise of any specific back issues which you desire, we may be able to furnish them for you.

GETTING OUT SOON?

If you are getting out of the Army soon, don't hang up your wings. The same joys of flying plus some extra money may be yours if you join up with the National Guard or a Reserve Unit. For a list of these and where they are located write—

EDITOR
U.S. ARMY AVIATION DIGEST
FORT RUCKER
ALABAMA 36360

From Fabric To FLIR

Brigadier General William J. Maddox Jr.
Director of Army Aviation

Congratulations on the first 30 years!

THIRTY YEARS in the long chronology of military history is a short period of time. It is approximately the same period as Alexander the Great's total lifespan (he died at age 33 after having conquered the known world). It is the length of an obscure European war of the 18th century. Thirty years is less than the time between the Civil War and the Spanish American War. It is the time between the present and the black days of early World War II. Thirty years is the precise age of Army aviation.

Not long ago I read a statistic which said that over 90 percent of all the scientists who had ever lived are living today. This statistic points up the fact that technology is moving extremely fast. Over the life of Army aviation it is easy to see the difference between the L–4 Cub and the AH–56A Cheyenne. Measured in technological terms, 30 years is the difference between fabric-covered airplanes and FLIR (Forward Looking Infra Red) equipped helicopters.

So "Fabric to FLIR" is the hardware side of the story and hardware has advanced the state of warfare by leaps and bounds in 30 years. It has enhanced the participation of Army aviation in core combat actions. In recent years Army aviation has carried the Army in the Republic of Vietnam and the war under its wings and rotor blades. But that is a story to be recounted later.

During Army aviation's 30 years of change and turbulence one thing has remained constant. This is the dedication to land combat. The visionaries who procured and operated the Piper Cubs in 1942 had no way of knowing about the helicopter of the 1960s. They did not know the words *gunships, aerial cranes, C&Cs* and *SLARs*. Yet they had the concept. And the concept has been firmly fixed throughout the 30 years.

At the time Army aviation congealed at Ft. Sill, OK, the U. S. had lost the bulk of its Pacific fleet. It did not control the sea lanes to Europe or the coastwise steamer routes along our own coasts. Troops of the 5th Division had just landed in Iceland but only American observers were in active war zones in Europe and Africa. In the Pacific our toehold was in Australia. The Solomon campaign was yet to come.

In such a situation the U. S. was forging the means for a comeback. Divisions were forming in the States. Our national policy was directed toward a 50,000 airplane force. This force was air power. Ground power was separate, geographically and philosophically. As the Army visionaries looked at the situation, if air power were to be separate then aviation technology still had something to offer ground formations.

So it all started in the artillery. As the result of tests in 1942, every artillery battalion was assigned two fabric-covered Cub airplanes, each with a crew of one pilot and one observer. Initially the general consensus was that such aircraft could not survive on the modern battlefield. The original tactics called for flights of 7 minutes duration—in other words, pop up, look and sideslip to a landing.

The World War II experience with the Cub reproved the basic law that theory usually is different from practice. In the case of the Cub, what was conceived to be a very short sneak-and-peek mission turned out to be the backbone of artillery observation. Statistically, over 90 percent of the observed artillery missions fired during World War II were adjusted from Army aerial platforms.

Instead of vulnerable the Cub turned out to be survivable. It lived and worked for the ground soldiers because it was integrated with them. The fabric skins seldom were punctured because the enemy soon learned that to trifle with the Cub resulted in a battalion artillery volley. The Messerschmitt found it was too fast to catch the hedgehopping Cub. Instead of 7 minute missions, the Cub normally flew to the extent of its fuel supply. Most divisions maintained aerial artillery observation from dawn to dusk and as required during the hours of darkness.

The philosophy of assigning aircraft to individual artillery battalions is known to many as decentralization. However, decentralization is a long and sterile word. What the light aircraft did for artillery battalions has much

more emotional appeal. It provided the ground commander with the tools he needed on a fulltime basis to do his assigned tasks. It meant that doctrine did not stand in the way of getting the job done. To the Piper Cub pilot it meant that his first call and duty was to the soldier on the ground.

The Army pilot became known for his "Cub spirit." This was his intense desire to perform the mission and to remain customer oriented. He placed first priority on his unit's assigned mission. He had no other loyalties and no other mission to reduce his effectiveness as part of the land battle. This early Army aviator was an innovator. He flew in miserable weather, he made road landings, he landed in cabbage patches—if these things were necessary to get his job done. He recognized early that he must retain his prime orientation toward the ground. He became an Army officer first and an aviator second.

Perhaps the largest lesson learned from the Cub was that technology is not the exclusive province of any restricted group. If aircraft could assist in doing the ground job better, it followed that the Army needed aircraft. Accordingly, Cubs ceased to be the exclusive province of the artillery. At the conclusion of World War II infantry, armor, engineer and signal units also justified the fulltime requirement for light aircraft. Any number could play if they had a fulltime need.

The Korean War was pretty much a replay of World War II type aircraft. Most of the equipment was the same and so were the people. However, there was one new ingredient: the helicopter. This machine was used extensively for command and control and medical evacuation, but only in the later stages of the war was the helicopter used to a limited degree in troop movement behind friendly lines.

What occurred in Korea provided an impetus for testing and experimentation on the part of the visionaries of the 1950s. By the 1960s a second generation of hardware was available for the Vietnam conflict. The concepts followed rapidly. We found that we could be truly airmobile—that is, we could perform all five functions of combat for the first time with aircraft. So we in aviation became the workhorses of the Vietnam war. We air assaulted into landing zones; we provided covering fires for insertions; we reconnoitered ahead of our advancing troops; we covered them with accurate fires; we pounded the enemy; we picked up the wounded; we inserted the vital supplies and personnel; we screened the flanks; we delivered the water, the fuel, the ice, the ice cream, the entertainers. We controlled both airmobile and ground operations for helicopters. This was true *integration* and it was *true airmobility.*

In the performance of these tasks we demonstrated to the rest of the Army and to the world how technology could produce breakthroughs in the conduct of land combat. We showed that the helicopter was not a transient visitor to the battlefield but was a fulltime member of the team. One point of major significance was that the Army completed its shift from dependence on airplanes to helicopters. While fixed wing craft have performed yoeman service and still are highly important for utility work (U–21 Utes) and sophisticated reconnaissance (OV–1 Mohawks), the 30th anniversary of Army aviation finds the helicopter as the "capital ship" of the aircraft inventory. This is because the helicopter is highly flexible and is so compatible with the operation of front line ground units. On a quantity basis aviation organizations have reached division size. Today we have aviation groups, aviation battalions, cavalry squadrons and aerial artillery battalions. In such an aggregation it is reasonable to ask, Should there not be an Aviation Branch?

The answer lies back in 1942. Aviation entered the Army that year to assist in doing the ground job better. Aircraft and aviators were integrated into ground formations. The key word is *integration.* Where there is integration there is a coincidence of interest; where there is separatism there tends to be exclusiveness and a divergence of interest. For this reason the aviator must do as he historically has done: opt for integration.

As we survey the status of Army aviation on this 30th birthday, we find ourselves translating our recent history into gunships, doctrine and organization for the future. Once again we are challenged both in terms of effectiveness and survivability. The situation is very similar to 1942 when the role of the Cub was being debated: Could it survive? Could it contribute?

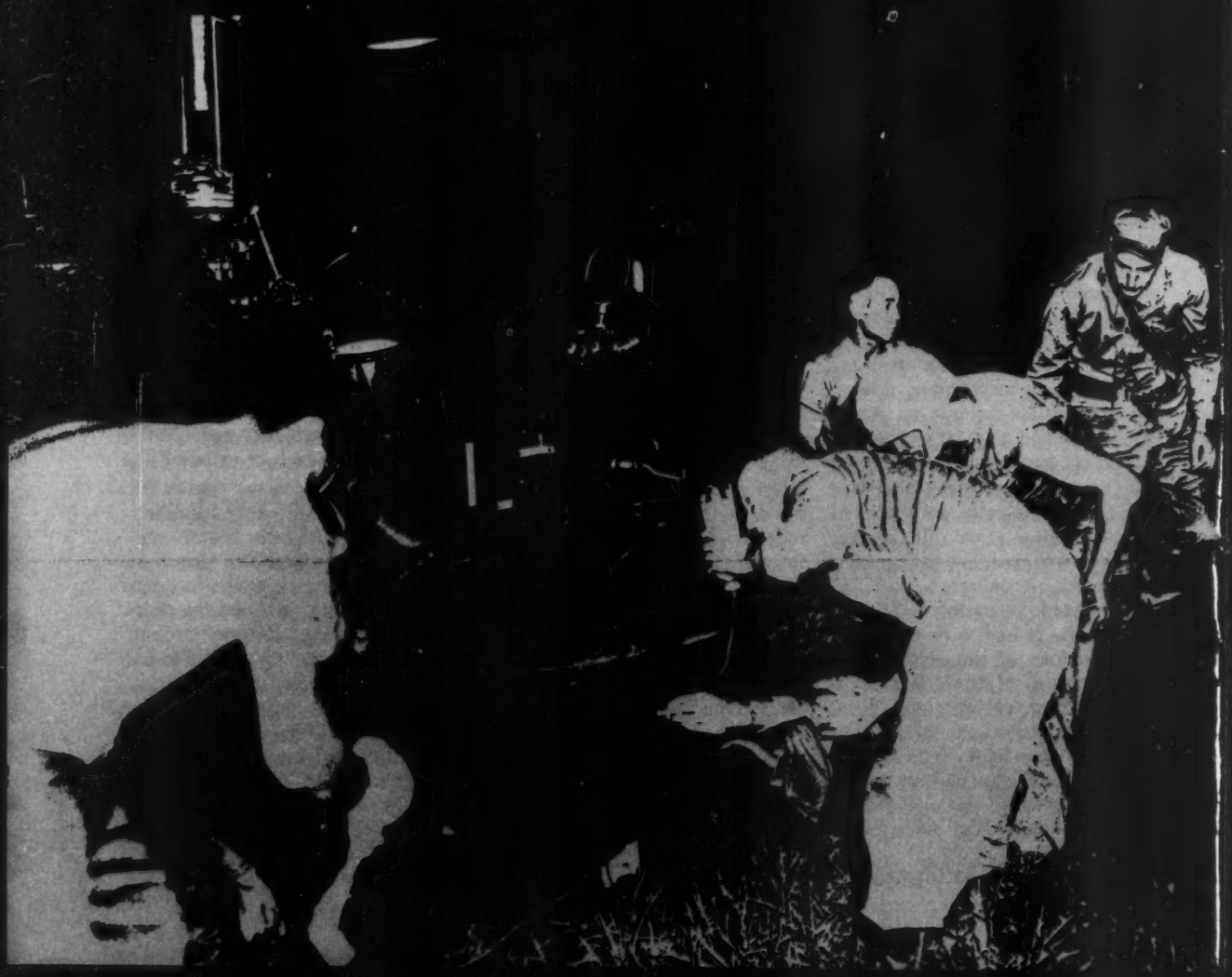
On this birthday we can detect a quantitative shrinking from our peak of over 25,000 aviators and over 12,000 aircraft. However, there can be no reduction in quality. The "Cub spirit" and the dedication of the aviator to the ground soldier must continue to guide us. What was launched of necessity in World War II, sustained by technology ever since, is destined to reach new heights if we maintain our spirit. The future is limited only by our imagination and determination.

That They May Live

Colonel Waldemar A. Solf (Retired)
Chief, International Affairs Division
Office of The Judge Advocate General

". . . there is a golden period of surgery when a wounded soldier's chance of survival, if placed in the hands of skilled medical personnel, is enhanced . . . " In the Republic of Vietnam the aeromedical evacuation helicopter has provided the rapid means of casualty evacuation . . . the author discusses proposed International Law Protection of medical aircraft in time of war.

IN 1859 THE Battle of Solferino resulted in 39,000 casualties. The wounded were left largely uncared for, a fact that motivated a Swiss businessman Henri Dunant to devote his life to work for the care of wounded in war. He sparked the formation in 1863 of the International Committee for the Relief of Wounded—a



group soon to become the International Committee of the Red Cross.

The world was ready for the project of the committee. It was the era of Florence Nightingale and Clara Barton. The committee worked fast and by 1864 a diplomatic conference called by the Swiss Federal Council adopted the first Geneva Convention for Ameliorating the Condition of the Sick and Wounded in the Field. The basic principle underlying that convention was that the wounded and sick who are no longer combatants, whether friendly or enemy, must be collected and cared for without any adverse distinction. Medical personnel, ambulances and installations were likewise to be protected.

It was recognized that effective protection was dependent on recognition. For this purpose the Red Cross on a white background became the distinctive emblem of protection. It was to be displayed conspicuously on medical personnel, ambulances, hospitals and other medical installations and units.

The First Geneva Convention was revised and updated in 1906, 1929 and 1949. In the meanwhile the International Committee of the Red Cross has gradually expanded its efforts on behalf of war victims. It has been instrumental in initiating Geneva Conventions for the Protection of the Wounded, Sick, and Shipwrecked at Sea (Second Convention, 1868, 1907, 1949), Prisoners of War (Third Convention, 1929 and 1949), and Civilian (Fourth Convention, 1949).

The International Committee of the Red Cross has recently undertaken new initiatives in preparing new rules to elaborate the humanitarian law for the protection of war victims and to secure its better application.

Having over 100 years of experience with the First Geneva Convention, it is reasonable to expect that the Geneva Convention dealing with the wounded and sick in the field would have fewer deficiencies than the newer and more complicated conventions. The principle deficiency of the First Convention involves the protection of aeromedical evacuation.

Ambulance aviation was recognized by the First Geneva Convention at the time of its 1929 revision. Relying for recognition on a conspicuous display of the Red Cross emblem on an aircraft otherwise painted white, the 1929 convention protected medical aircraft to the same extent as mobile medical units except that they were prohibited from operating forward of the line of clearing stations.

By 1949 it was apparent to the experts who considered the massive revision of the Geneva Conventions that the capability to engage aircraft by interceptor planes and from the ground had exceeded the means to recognize protected aircraft by visual means. Only an agreed flight plan appeared to be a feasible measure to afford medical aircraft a real degree of security and to provide belligerents with adequate safeguards against abuse.

Accordingly, the 1949 conventions afforded no protection to medical aircraft unless they were "flying at heights, times and routes specifically agreed upon between the belligerents concerned." Moreover, "unless agreed otherwise, flights over enemy or enemy-occupied territory are prohibited."

The effect of these provisions was either to keep medical aircraft permanently grounded, or to subject their operations to the risk of attack without any legal protection. Agreements on flight schedules have seldom been feasible particularly because a technical channel of communication was not provided. Two technological developments since 1949 justify a re-examination of these legal limitations:

• The development of helicopter ambulances makes feasible the prompt evacuation of wounded directly from the battlefield, thus greatly enhancing prompt treatment and the chance of survival.

• Advances in identification procedures, particularly involving radio communication and electronic identification procedures, together with flashing lights, make feasible better identification of medical aircraft.

The problem was first considered by the "Commission medico-juridique de Monaco" in 1965 which drew up a draft protocol regulating Medical Transport by Air in Time of Armed Conflict.

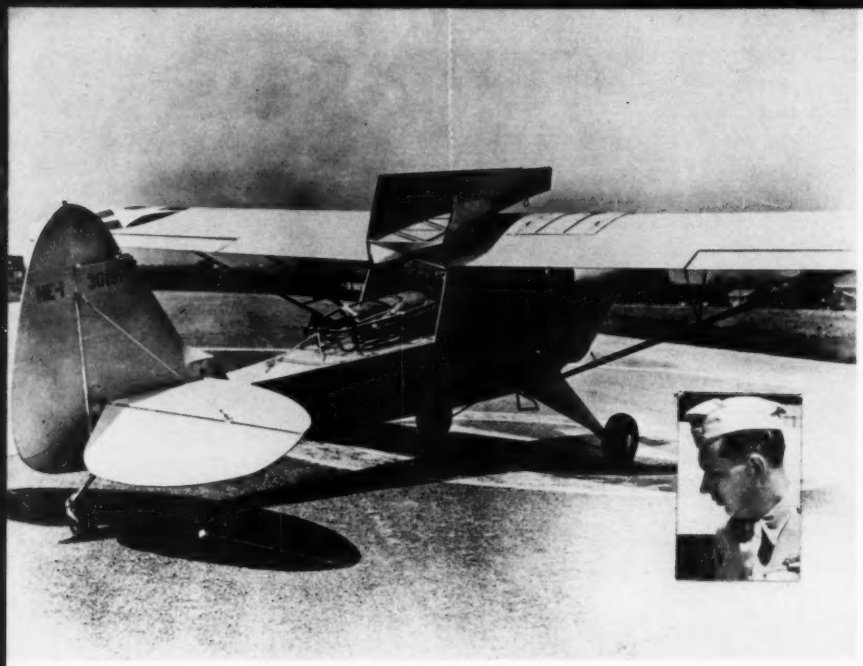
The Monaco draft does away with the requirement for an agreed flight plan except in battle areas and while flying over enemy or enemy-occupied territory. It envisions that a system of flashing lights, radio links and beacon transponders would serve to reduce the danger of misidentification, but primarily in rear areas. The salient provisions of the Monaco draft are:

Article 1. **Military aircraft used, whether temporarily or permanently, by parties to a conflict for the evacuation of wounded and sick and for the transport of medical personnel and equipment shall not be attacked, but shall be respected and protected throughout their mission.**

Article 2. **All aircraft operating for army medical services shall be respected and protected in all circumstances, both in time of peace and of war.**

Article 4. **The aircraft mentioned in the foregoing articles shall display conspicuously the distinctive sign of the red cross (red crescent, red lion and sun).**

They shall, moreover, be fitted with a continuous system of either light signals or of instantaneous electrical and radio identification, whichever is appropriate to operating



In June 1943 Major Victor E. Frazier (inset) installed a trapdoor and litter behind the pilot's seat of this L-4. At Bouginville L-4s were similarly modified later in World War II, and used extensively in the Philippines for med evac

conditions, or with both.

Article 5. **It is forbidden for all aircraft mentioned in the present regulations to fly over enemy or enemy-occupied territory or areas where belligerents are engaged in military operations.**

Notwithstanding the preceding clause, exceptions shall be permissible by special agreement between belligerents or with an international organization.

Article 6. **All aircraft covered by the present regulations when flying over enemy or enemy-occupied territory shall be respected but shall obey any order to land or alight on water.**

In the event of a landing on enemy or enemy-occupied territory, whether forced or as a result of fortuitous circumstances, the wounded and sick may, in the absence of any contrary agreement between the parties in conflict, be taken prisoner of war. The medical personnel and crew shall be treated in conformity with the provisions of the present convention.

Commenting on the Monaco draft, a U. S. expert at the 1971 Conference of Government Experts sponsored by the International Committee of the Red Cross commented in part as follows:

"Article 1 is a good approach and provides an excellent foundation on which to build a protocol which would enable swift battlefield evacuation of wounded, but from that point on everything is devoted to world organizations and airline type operations with the evacuation of battle areas ignored and inhibited to the point of stripping them of protection and the actual prohibition to fly where belligerents are engaged in military operations.

"There is a golden period of surgery when a wounded soldier's chance of survival, if placed in the hands of skilled medical personnel, is enhanced. The helicopter has the capability of rapid evacuation, spanning in minutes distances that it would take conventional ground means of evacuation literally hours to traverse, thus placing the seriously wounded in field medical fa-

Light observation helicopters established the feasibility of the battlefield aeromedical evacuation concept during the Korean War

Medical evacuation techniques were developed and practiced for most Army aircraft such as this U-6 Beaver during the 1950s

cilities within this golden period and greatly increasing his probability of survival. But, alas, Article 5 prohibits flying where belligerents are engaged—the very place where swift medical evacuation is needed most.

"The discussion refers to as they approach a combat area, it is important that their medical mission should be clearly and distinctly signaled to the troops of both sides and also observes that a helicopter approaching enemy units is liable to offer an excellent target. From this, the articles of the draft revert to agreement and forbidding all aircraft mentioned in Articles 1 & 2 from flying in areas where belligerents are engaged in military operations which takes us back to the basic problem with the 1949 convention of keeping them grounded or flying their battlefield missions of mercy at their own peril.

"The ideas on radio detection (radar), additional light signals and radio links are excellent and in keeping with advances in aircraft detection and antiaircraft defense. The principles put forth regarding safety of medical transport are sound but appear to fall short of the desired goal of providing protection for evacuation of the battle areas.

"Further in the discussion it is stated that it would be desirable that the adoption of an identification system using blue lights should be preceded by preliminary consultations carried out by the International Civil Aviation Organization (ICAO). I can find no place in Volume VII where this has been accomplished. With all due respect to the learned delegates at this table, I would question our qualifications to discuss electronic or radio-electrical identifications and to know if we are in fact giving protection or placing impossible demands which cannot be adhered to. We must study what the experts have to say before reaching any recommendations.

"For these reasons, I would submit that this committee should recommend that further study and consideration should be given to this protocol by experts who are technically qualified in electronics, communications, aviation and naval operations before being considered by this committee. We can agree with the principle that additional protections are needed for the safety of medical transport, but I would go one step further and recommend that consideration should also be given to battlefield evacuation by dedicated medical helicopters and that definitive guidelines should be established that would enable these helicopters to carry out their mission with some reasonable assurance of safety."

* * *

The above remarks by the U. S. expert were taken seriously by the Conference of Government Experts, by the ICRC, and by the Department of Defense. It is expected that in the second ICRC Conference of Government Experts which will meet in Geneva the U. S. delegation will propose a study of rules and guidelines under which battlefield medical evacuation may be taken with greatly reduced danger of misidentification and attack.

The Distinctive Signal

Essential to any system for the

Continued on page 25

The CH-37 Mojave, a medium tactical transport helicopter of the 1950s, was designed to carry 24 litters when used for aeromedical evacs

Aviator Support to a Counterinsurgency War

The aviation training program was rapidly expanded but the extensive lead time it required may not be available in future tactical commitments. It was hard to come by combat-ready aviators such as these whose CH-47 Chinook (left) airlifts 1st Cavalry Division troops in Vietnam tactical operations

Colonel DeLyle G. Redmond

AVIATION is one of the most essential and expensive commodities in the U. S. Army. Now, with the draw-down in the Republic of Vietnam and restrictive budgets looming in the 1970s there will be a great temptation to reduce Army aviation in an attempt to save immediate dollars. But, prior to any major force structure changes, careful consideration should be given to the lessons learned when innumerable obstacles had to be overcome to meet the challenge of filling the aviator requirements of Vietnam.

In mid-1965 when the major aviator buildup began, aviation personnel planners were faced with the seemingly impossible task of filling the endless requirements for Army aviators in Vietnam. Aviator strength in Vietnam then was only 1,200 or 13 percent of the total aviator inventory. Eventually at its peak the Vietnam requirement alone accounted for almost 38 percent of the Army's aviator strength—and almost 50 percent of the force would be deployed overseas. This presented many management problems and left few resources to satisfy other requirements worldwide.

During the initial stages of the Vietnam conflict, aviators and not aircraft were the pacing factor in determining the rapidity of the buildup. While the production of UH–1 type aircraft, which was the backbone of the fleet, increased to 75 per month as early as FY 63, aviator production did not keep pace. This situation resulted from several reasons. Expansion of pilot training was not supportable until the 11th Air Assault Division tests in 1964 and 1965 confirmed the need for large scale airmobile forces. Actual combat requirements in Vietnam followed closely in the wake of this test. Additionally, initial authorizations for UH–1 aircraft included only a pilot, whereas combat experience indicated that a copilot was essential. Aviator requirements also were increased when authorities in Vietnam decided to expand the number of helicopters in an assault company from 25 to 31. This was to provide sufficient aircraft to lift the assault elements of an infantry company and still retain eight armed helicopters in each unit

To keep pace with the buildup, the aviation training program underwent a very rapid expansion. Between 1966 and mid-1968 the aviator training output increased from 125 to more than 600 per month. The employment of the airmobile division alone increased the annual training requirement by almost 2,000 at the end of 2 years. Aviator authorizations and aircraft also substantially increased during this period.

"... backbone of the fleet." After dropping troops into a rice field near Bien Hoa, Huey crews cover their advance into dense jungle to hunt VC

It takes a great deal of time to translate increased pilot objectives into deployable aviators. A lead time of 15 to 18 months is required to recruit, train and deploy aviators after a decision to increase training has been made. Furthermore, in order to increase aviator production, training bases must be expanded and aviators must be diverted into the base to function as instructors. These aviators would otherwise be available for early deployment.

At the outset it was readily apparent that the aviator personnel program must be closely managed to ensure maximum utilization of the force. This rquirement fell primarily to the Executive for Army Aviation (OPXAA) within the Officer Personnel Directorate. (All data discussed in this article was obtained from this office.) Several actions were taken at the Department of the Army level to minimize the problems associated with the rapid expansion and the resultant aviator shortage.

First, the policy of a 1-year tour in Vietnam and Korea was to be continued. There also would be a minimum of 12 months between Vietnam tours with the ultimate objective of attaining a 25-month turnaround interval.

Second, a worldwide rotational base was established and all stabilized tours were eliminated with the exception of the aviation training bases. Instructor pilots assigned to the various training bases were retained onstation for 18 months to provide a degree of utilization after they had received instructor training. The only exception to this rule were aviators who had not served in Vietnam or those volunteering for Vietnam. Aviators in these categories were stabilized for only 12 months.

Third, nonaviation or ground duty assignments for commissioned officer aviators below the grade of lieutenant colonel were suspended along with reductions in military and civil schooling for aviators. Those on such assignments were considered a part of the supplemental force or reservoir of aviators available for assignment to meet contingency requirements.

Fourth, there was a worldwide draw-down of aviators to support Vietnam. In some cases commands were reduced to as low as 10 percent of their total aviator authorizations.

The requisitioning authority for each command was reviewed and revised quarterly by OPXAA which provided increases in command manning levels as rapidly as resources and priorities permitted. Requisitions were closely monitored to assure fill action provided for an adequate mix of aviation qualifications based upon the as-

sets available for assignment, the number and type aircraft within the command and the established priority of fill action for the requisitioning command. In this regard a liberal policy of branch and grade substitution was pursued in order to assure the greatest amount of flexibility in meeting the desired skill requirement and to provide for equity of assignment.

A fifth action taken at DA level was to deploy the maximum number of aviation units as quickly as possible and to attain a 1-year interval between short tour areas. Vietnam was manned at only 90 percent of its aviator authorization while most other combat units maintained over 100 percent strength. Therefore, it was not uncommon for some aviation units to periodically operate at strengths as low as 65 percent of authorization. This occurred because there are always a number of people who are not available for duty due to absences caused by wounds, accidents, sickness, leave, rest and recuperation, details and the like. As a result many aviators were required to fly a significant number of combat hours above the 90 hours maximum recommended for a 30-day period.

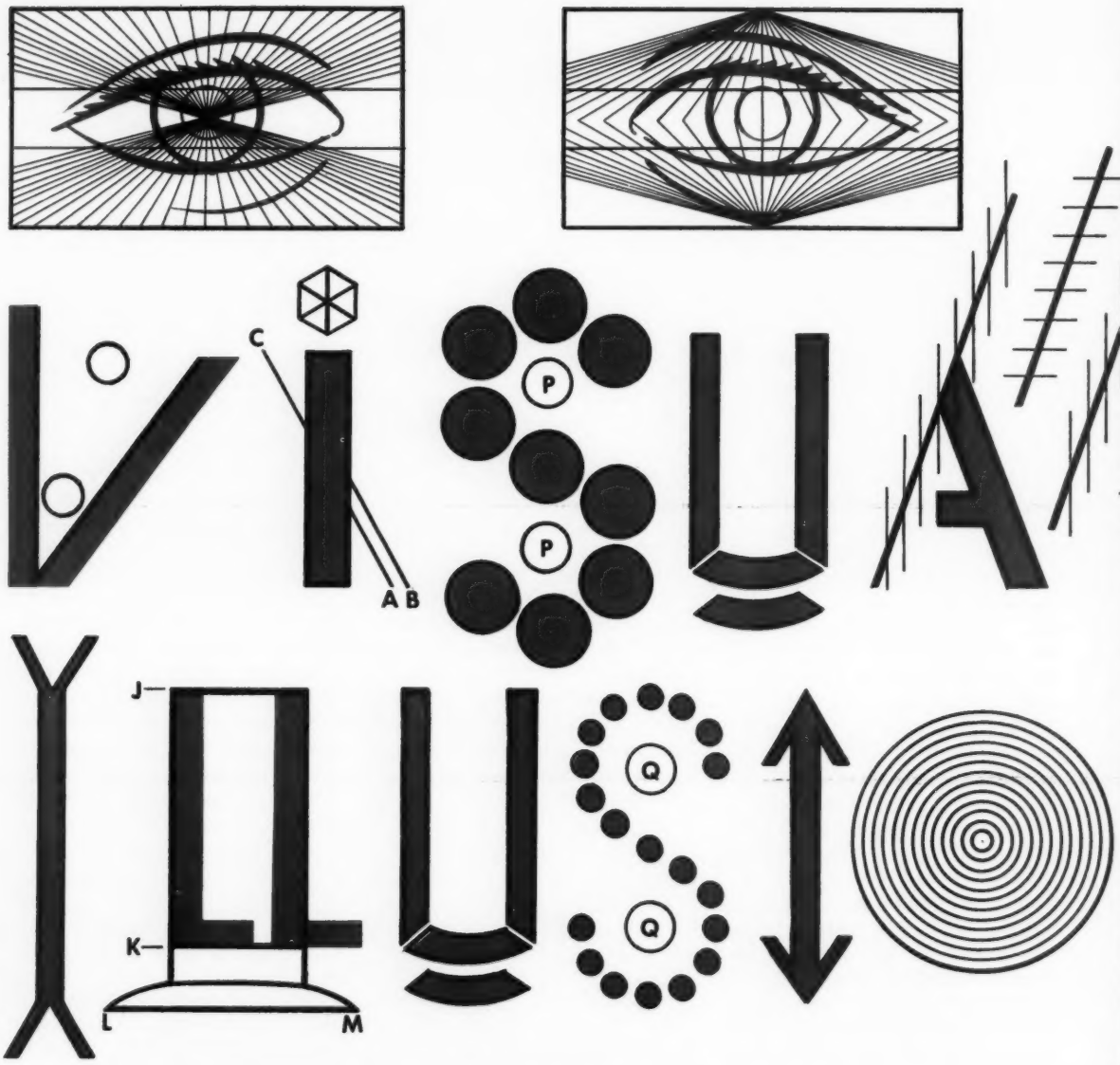
Sixth, aviators were assigned to positions for which a lower grade was authorized. This permitted additional flexibility of assignments. Lieutenant colonels often filled lower ranking positions and all majors through warrant officers were considered as cockpit aviators. At peak strength Vietnam had over 200 lieutenant colonel aviators of which over 100 were filling lower ranking positions. This also resulted in some aviation companies authorized one major as commanding officer deploying to Vietnam with over 30 majors assigned. In addition, many aviation positions for which rated personnel were not absolutely essential were filled with nonrated officers. This depleted the expertise available in the unit and undoubtedly injected a measure of degradation in the overall effectiveness of the unit; however, it provided increased flexibility and filled many positions which otherwise might have remained vacant.

After initiation of the buildup in 1965, many other problems had to be resolved in order to accommodate the growing number of aviators and to sustain the force in Vietnam. One of the major difficulties encountered was simply attempting to put a handle on this explosive, hitherto small, branch-oriented force. Data concerning aviator skills, assignments, availability, aircraft qualifications and innumerable other items were required to properly manage these critical assets. It was found that the basic information available on the central data files was often incomplete or in error and could not be entirely relied upon as the basis for significant decisions or projections.

One of the primary areas of concern was the requirement to project the time between repetitive tours so that it would not drop below the minimum 12-month tour interval. This was necessary to determine fill dates for activating units and to ensure that sufficient aviators were available to satisfy other Vietnam replacement and unprogramed loss requirements. Initial efforts in this area were handwritten flow charts incorporating the best available data on information, such as anticipated availability dates, retention rates, aviation school output, Vietnam and other short tour personnel requirements, stabilized training base tours, combat loss rates and projected nondeployables. The information was continually refined and the U. S. Army Behavioral Research Laboratory developed a computer rotational model from this basic data. This model eventually proved to be so accurate that requisitions for Vietnam replacements were actually validated from

Continued on page 28

A worldwide drawdown of aviators was necessary to support Vietnam. A CH-54A Flying Crane lifts a 6 ton 155 mm howitzer on a 27 mile trip to the Mekong Delta



EXAMINATION—Eleven Simple Questions To Boggle Your Mind's Eye!

1. Are the two horizontal lines across the eyes at the top of the page straight lines?

2. In the letter "I" of *Visual*, which line is the continuation of C, A or B?

3. Are the parts under the "U's" in *Visual Illusions* equal in size to those in the bottom of the "U's" or larger?

4. Are the long lines surrounding the "A" and "L" of *Visual* parallel?

5. Which "I" in the word *Illusions* is taller?

6. Looking at the "L's" in *Illusions*, which is greater, the distance from the top of the band to the top of the hat (JK), or the distance across the brim (LM)?

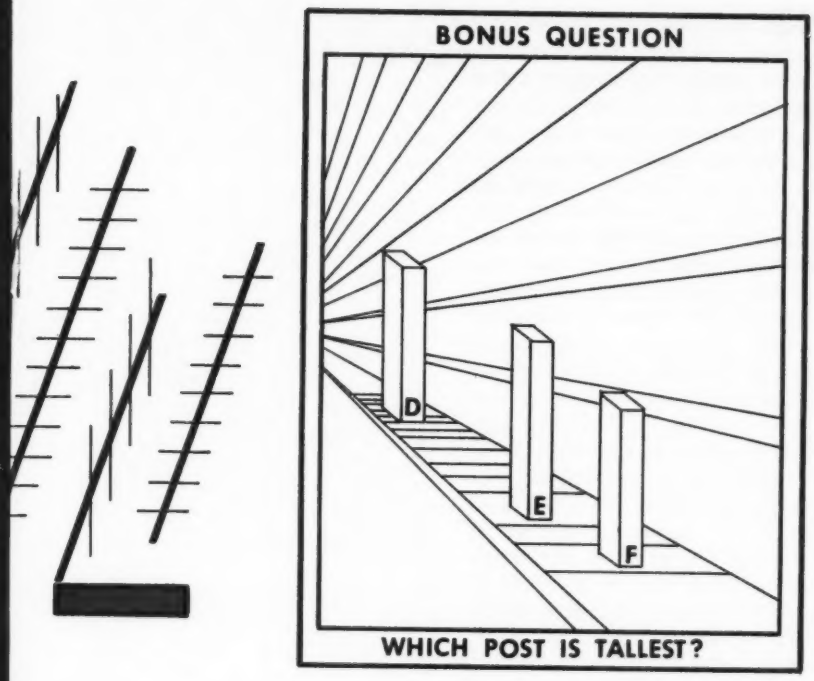
7. Which circles look bigger, the inner ones (P) of *Visual* or the inner ones (Q) of *Illusions?*

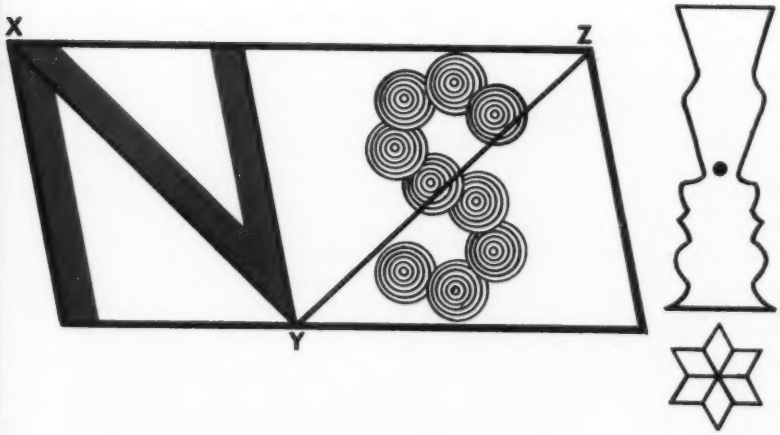
8. If you move the page in a circular motion, do the "O" and last "S" of *Illusions* rotate?

9. Is the cross piece (XY) of the "N" in *Illusions* shorter than the line YZ?

10. Are the dot on the "I" of *Visual* and the dot of the exclamation point at the end of *Illusions* two dimensional or three dimensional figures?

11. In the bar of the exclamation at the end of *Illusions*, do you see two profiles or one vase?





Major Nicholas E. Barreca, M.D.

Provided by the Society of U. S. Army Flight Surgeons

ARE THE EYES truly capable of seeing? Can they be accurately depended upon? Is what you see really what you get, to quote a recent quip? Usually yes! Sometimes no! From the preceding little test, perhaps you've become more cautious? (With the aid of a ruler most of the real answers can be determined.)

Sometimes then, the objects we view are influenced by their surroundings. Take a look at the "moon-rise." Early, just above the horizon, among the housetops, skyline or mountains, it looks quite large. Hours later, brighter, it looks quite small, surrounded by the void of space. If measured by a ruler or sextant, one would see that its size was equal in both instances.

Consider a group of individuals witnessing an accident, some have differing vantage points, others the same. How many varied accounts does an accident investigator hear about? Many to be sure, but why? Haven't all seen the *same* accident? Most certainly, but each has seen it from a slightly different angle, some perhaps with a slightly or even markedly different surround or background. Each witness invests his account with his individual knowledge, experience and ability to understand what he has

VISUAL ILLUSIONS

seen. Many accounts will be clothed by each individual's psychological reaction to the scene. Some will exaggerate, others will unconsciously repress certain elements.

Vision is nevertheless one of man's strongest and most dependable senses of balance. Regardless of whether an air crewman is VFR or IFR, the visual sense will play the major role if he is to be properly oriented. Vision is a complex sense; however, dependent upon varied clues. The more clues available usually the more accurate our orientation. With few clues our perception can be false resulting in what are commonly called visual illusions.

Before considering the important visual illusions in aviation, let's take a *look* at the various factors that play a role in visual perception. First of all there is our ability to see clearly, sharply and precisely. This is known as acuity. Our *central vision,* that in the center of our visual field when looking directly at an object, is the most precise. It is limited by the time one takes or has available to see. It takes time for the brain to interpret what the eye sees. A quick glance or vision from a high speed, low flying aircraft (sometimes known as seeing at "supra-visual speed") can be quite deceiving. This is because the precision possible with central vision is limited by time. Our ability to see precisely is enhanced too by the eyes' ability to converge on a moving object and accommodate (change the focal length or power of its lens) in order to see sharply at different distances, near and far.

Associated with our central vision is the qualitative character of our sight, *color.* It is the cone cells in the retina that enable the eye to perceive color. With color one has even greater information with which to characterize what one sees. However, color vision is limited by the level of illumination. At dawn or dusk or as darkness approaches color vision becomes less reliable and finally disappears. So only during daylight hours can we depend upon the added dimension that color gives our sight.

The next important aspect of sight is *peripheral vision.* It is the vision around the borders of our visual field blurred though it may be that permits us to remain aware of our surroundings while still concentrating with our central vision. While the acuity of peripheral vision is limited, it should direct our attention and central field of vision to more accurately define what is visually detected. Thus, while peripheral vision is for detection, central vision is for identification.

At night this marriage is impossible. For *night vision* one only has his peripheral vision. His central vision becomes an awesome blind spot for the cones are insensitive to low levels of illumination. Thus, at night we must depend mostly upon the adapted rod cell vision of our peripheral vision for these cells are very sensitive to light. Nevertheless, while sensitive to light they are not as specific as the cones and see only blurs or silhouettes. Illusions then, as one might expect, are most common when levels of light are diminished and we are limited to the vision of form rather than character.

Depth perception is perhaps our most complex attribute of vision. Without perception of depth flying would certainly be impossible. Stereopsis is a refined form of depth perception requiring the use of two eyes. The information obtained from one's ability to stereopsis might be more aesthetically than operationally useful. It gives us a feeling of form and contour but is likely not essential for distance judgment. Most frequently our clues to depth or distance are provided by "one-eyed" or monocular factors.

The monocular clues to depth perception are many and varied. Linear perspective is one important clue. It includes the convergence of parallel lines in the distance, a factor that is taken advantage of by artists. Then too there is a loss of discrimination or texture with distance that results in a gradient of change in the appearance of our surroundings as we approach them. Apparent foreshortening and vertical position in the field of vision are other clues to depth. For example, there is the apparent shortening of an inclined line compared with a vertical line. In vertical position or height objects seen above others are judged as being more distant, while foreground objects appear lower than distant objects. Aerial perspective provides another clue, as colors fade with distance due to the interposition of haze and other atmospheric conditions. Terrestrial association permits the comparison of commonly relatable objects in a field of vision. Then there is the overlapping of contours or interposition of objects in the field that permits one to realize which is closer or further in the field. The known and relative size of objects is also important as they reflect their size upon the retina of the eye. As objects move closer in a field they increase in size indicating they are moving closer. Lights and shadows or illumination perspective are still another clue to depth perception. Finally there is motion parallax, often considered one of the most important clues. Motion parallax refers to the apparent relative motion of stationary objects as an observer moves across the landscape. Near objects appear

to move backward to the path of motion and far ones seem to move with it.

Most of the clues to depth perception require the use of central vision and good illumination. As night falls so does depth. Thus night brings with it many illusions. Since depth perception is a complex process, one can expect that illusions would be commonly associated. The common landing illusions of runway width, slope and other conditions have been previously discussed for both fixed ("Aeromedic—Visual Illusions," May 1971 DIGEST) and rotary ("Aeromedic—Look Out Below," August 1971 DIGEST) wing aircraft. These are by far the most common and complex of the visual illusions.

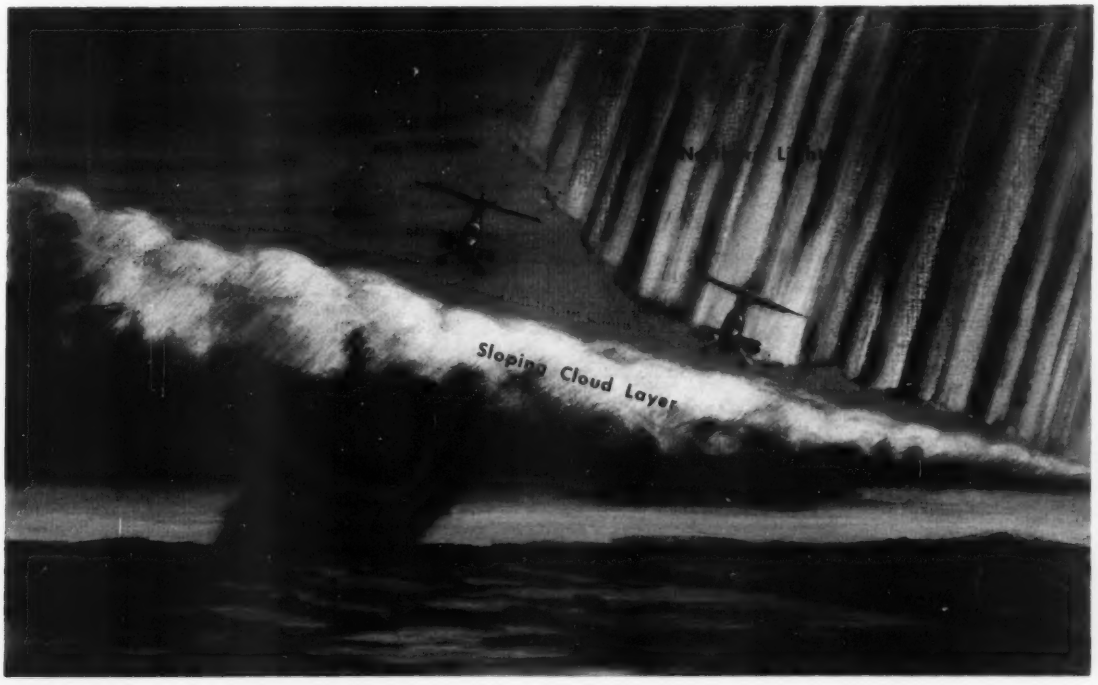
There are a series of other visual illusions that we must also be concerned with. Remember that vision is a strong stimulus to orientation. When clues to orientation are scarce, our eyes can easily deceive us even in daylight, even more so at night. Let's consider some of the more common illusions, some of which you may have experienced:

• *False horizons* (see figure 1). This is an illusion experienced when objects other than the actual horizon are interpreted to be horizontal. For example, an aircraft flying between two cloud banks may be flown in relationship to the lower cloud bank because the pilot feels that the lower cloud bank is horizontal. In actuality the lower cloud may be at an angle to the horizon. The plane then flies with a wing low.

• *Confusion of ground lights with stars.* Many pilots have put their aircraft into very unusual attitudes in order to keep some ground lights above them, having mistaken them for stars (see figure 2). Less frequent, but just as dangerous, the illusions caused by certain patterns of ground lights are imagined to be things which they are not. Some pilots, for example, have misinterpreted the lights along the seashore as being the horizon, maneuvering their aircraft dangerously close to the sea while under the impression of flying straight and level (see figure 3). Pilots have also confused certain geometric patterns of ground lights such as moving trains with runway and approach lights and have been badly shaken by their near misses.

• *Autokinetic illusion* (see figure 4). Autokinesis or the autokinetic illusion is the illusory phenomenon of movement which a static light exhibits when stared at for a long enough time in the darkness. The phenomenon can be readily observed by taking a lighted cigarette into a completely dark

Figure 1



room and staring at it until the light appears to move. The apparent movement will begin after approximately 8 to 10 seconds. The cause is unknown, but appears to be related to the fact that the eyes are unable to remain fixed on a single light view against a dark background. The illusion can be eliminated by visual scanning, by increasing the number of lights on aircraft or by varying the light intensity. This illusion is not exclusively limited to lights in darkness. It can occur whenever a small, bright, still object is stared at against a dull, dark or indescript background. Place a pink-colored dot about 3 inches in diameter on the chalkboard in class. Have your classmates stare at the dot. Eventually you will see it move. Flying over still water toward a raft could produce such an illusion. Fixing on a marker in the snow could produce similar results.

• *Size and distance illusion.* The size-distance illusion results from staring at a point of light which approaches and recedes from the observer. In the absence of additional distance clues, accurate depth perception is extremely difficult. Instead of seeing the light advancing and receding, the pilot has the illusion that it is expanding and contracting at a fixed distance from him. This illusion may also be dispelled by continually shifting the gaze.

• *Relative motion.* This illusion is similar to a person sitting in a car waiting for a train to pass. The train is actually moving, but the person in the car has the sensation that he is moving. This is often encountered by a pilot in formation flight. He sees motion of his wingman or leader and interprets that motion as his own. The only way to manage this illusion is for the pilot to be experienced enough to understand that such illusions do occur and not to react to them on the controls. A misinterpretation of relative motion can also take place when two aircraft showing lights are ahead of an observer and are rapidly separating. The illusion that one aircraft is approaching the other may occur. Finally, an illusion of turning can be produced in straight, level and parallel formation flight when the aircraft involved are flying at different speeds.

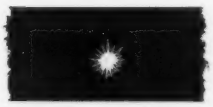
• *Reversible perspective illusion.* An aircraft may appear to be departing when it is in fact approaching. This illusion is often profound when a visually acquired aircraft is turning toward or away

Figure 2

Figure 3 ⬆

Figure 4 ⬇

The autokinetic effect is less:



The greater the brightness of the light

The greater the size of the light

The greater the number of lights

VISUAL ILLUSIONS

from your path of flight. Part of this phenomenon may be due to relative motion.

• *Altered planes of reference.* In this illusion there is an apparent tendency to climb as an aircraft approaches a line of mountains or clouds, even though altitude is adequate for clearance. The reverse is true when leaving such a line. In flying parallel to a line of clouds there is a tendency to tilt away!

• *Structural illusions.* Structural illusions are caused by heat waves, rain, snow, sleet or other disturbances of the air media through which we see. For example, a straight line may appear curved as seen through the heat wave of the desert. As seen through slanting rain or sleet, a single wingtip light may appear to the pilot as a double light or not in the location it actually is through the reflection.

• *Depth perception illusion.* Day and night flying over desert, snow or water are characterized by inadequate visual reference points. This results in poor or diminished depth perception and consequently potentially dangerous situations. This is a special hazard to helicopter pilots during night autorotations. The ground appears further away in these instances. Haze can produce a similar illusion. The use of polaroid lenses over water reduces reflections from the surface. This too could give one the impression that they were higher up than actually so. Water has claimed many an aviator, perhaps some with polaroid sunglasses.

• *Fascination (fixation) in flying.* Fascination is said to occur when a pilot for one reason or another ignores orientation clues while his attention is focused on some other object or goal. Target hypnosis is a common type of fascination and is characterized by the incidents that occur when pilots become so intent upon hitting their targets during gunnery that they neglect to pull up in time to prevent crashing into the target. Perhaps the dual pilot/gunner stations of our HueyCobra system are a necessary safety feature. Other types of fascination are associated with wheels-up landings, rigid fixation on the lead aircraft during formation flight and overconcentration on one instrument during blind flight.

• *Effects of flicker vertigo.* The possibility that flickering lights (in the range of 4 to 30 cycles per second) might cause disturbing symptoms including rare seizure episodes has been examined. To date few, if any, have been documented as caused by flickering rotor blade interrupted light. It is unlikely that flickering light of this type produces very many profound illusions, however, such phenomenon may certainly be distracting, irritating or annoying to some air crewmen.

Regardless of these recognized visual illusions, vision is still the most trustworthy sense of balance. One must learn to realize the minor limitations of the visual sense and compensate for known conditions that predispose to illusions. Whenever the eyes seem to be playing tricks, the time for careful reexamination, missed approach or instrument flight is recommended. The visual system doesn't often fool us twice. With increased concentration and purposeful pursuit of additional clues, orientation is recovered. Future Army aviation aircraft and missions will tax man's senses of orientation to the limit. The pursuit of a mid to high intensity conflict, with nap-of-the-earth flying, pop-up engagement... concealment by night, weather... all impossible without reliable visual surveillance and acquisition techniques... these will be the visual challenges of tomorrow.

INSTRUMENT CORNER

Q. When planning an IFR flight from destination to alternate airfield is mileage and estimated time enroute (ETE) computed from the destination airfield missed approach point or from the point of termination of the missed approach procedure?

A. It is recommended to compute mileage and ETE to an alternate airfield from the destination airfield missed approach point to the termination of the missed approach procedure, then selected routing to the alternate airfield.

TM 1-225, appendix c, page c-3, paragraph i(3) states, "Compute the ETE to the alternate airfield from the destination or other critical position along the flight path." This is general in nature, however, it should be noted that planning to the alternate airfield is mentioned and not to a fix serving the alternate airfield.

The use of the above procedure would include planning for all known or foreseen delays. Reserve fuel is for unforeseen circumstances.

Thorough flight planning for the proposed flight should prepare the pilot to recognize when he can accept deviations in routing or enroute delays at ATC.

Reference TM 1-225, USAAVN.

What, When, Where, How? NCOES!

The author relates the objectives of Army-wide NCOES and in detail how the program will enrich the careers of enlisted men in the air traffic management field... basic NCOES ATM courses are being initiated at the Aviation School, Ft. Rucker, on the 26th of this month. Advanced NCOES programs are scheduled to begin early in 1973

Lieutenant Colonel Jody L. Williams

THE NONCOMMISSIONED Officer Education System (NCOES) will become a reality for the air traffic management career field this year at the U. S. Army Aviation School (USAAVNS), Ft. Rucker, AL.

The NCOES concept has developed from recommendations for an enlisted career education system proposed by the enlisted grade structure study conducted by DCSPER, Department of the Army, in July 1967. The plan of the NCOES program is to revitalize the Army's noncommissioned officer corps and lead it to a high level of professionalism through military education.

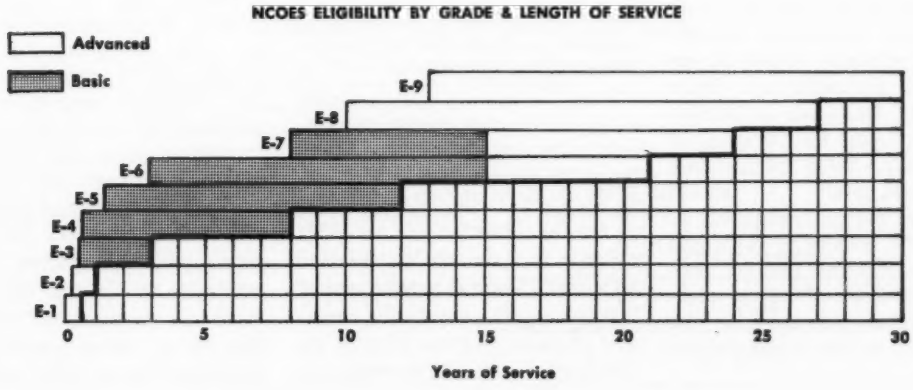
Military occupational specialties (MOSs) within the air traffic management career field are:

- 93H ATC Tower Operator,
- 93J ATC Ground Controlled Approach (GCA),
- 93K ATC Enroute Specialist,
- 93D Flight Simulator Operator and
- 71P Flight Operations Coordinator.

Three levels—basic, advanced and senior—are being developed to provide continuity through all NCO grades. The Aviation School's Department of Nonresident Instruction also is planning to prepare correspondence courses which will parallel the NCOES air traffic management series.

The Aviation School's basic level courses are for NCOs and specialists in grades E–4 and E–5 to prepare them for duties appropriate to grades E–5, E–6 and E–7. Additionally a limited 12-month pilot test of selected regular Army E–3s directly from advanced individual training (AIT) has been approved.

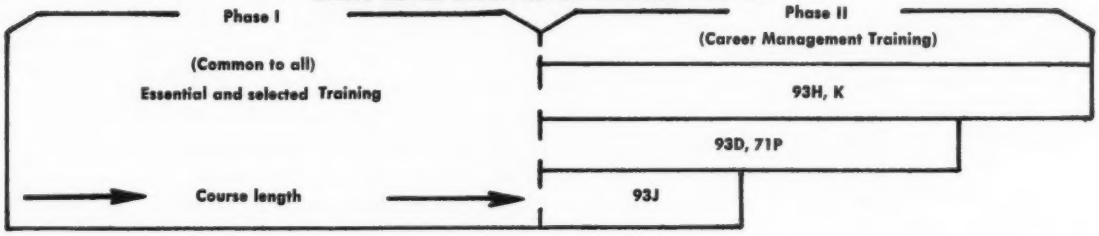
Advanced level courses also are



NCOES—BASIC LEVEL OBJECTIVES

- To prepare selected enlisted men in grades of E-3, E-4 and E-5 to perform duty as noncommissioned officers in the grades of E-5, E-6 and E-7
- To train in appropriate supervisory skills
- To develop a willingness to assume responsibilities and the confidence to apply technical knowledge
- To instill a feeling of dignity and a sense of duty and obligation for service

BASIC LEVEL MULTITRACK COURSE DESIGN



being implemented by the Aviation School to train E–6s and E–7s in duties applicable to grades E–8 and E–9.

The senior level course has been approved in concept only at this writing.

The basic level course objective is training designed to prepare the selected individual to perform at a high degree relative to his grade. The student will learn to use appropriate supervisory skills and develop a willingness to assume responsibilities with the confidence to apply technical knowledge. In doing this he will gain a feeling of dignity and a sense of duty and obligation for service.

Training will be conducted within the MOS or Army Career Management Field (ACMF) context to qualify individuals to command comparatively small groups of enlisted personnel of similar MOS or of the same or similar ACMF. Training will be oriented to appropriate MOS qualification at the 4 skill level.

Emphasis during training will be toward basic leadership skills and knowledge of those military subjects required to effectively command enlisted personnel at the team, squad, section or comparable level.

The air traffic management courses will be developed on the multi-track concept and the organizational concept will be considered as two phases:

Phase I—Training Subjects

(a) Essential training

(b) Selected training

Phase II—Career Management Training

Phase I will be given concurrently to all MOSs. In this phase training encompasses that instruction essential for each soldier to perform the minimum duties of his profession. The selected training category includes those subjects which DA or CONARC have designated for special emphasis. Most training subjects are included in this category and will be taught at the discretion of the School commandant, as developed by the systems engineering process.

Phase II training will be taught along the lines of career management in the same or a related MOS. The ATC management field is being developed to provide 93J training for the 93Hs and Ks and 93H training for the 93Js. Selected 93Ds and 71Ps will receive special 71P training to provide the necessary phaseover of the 93D to the 71P field at a later date. This will also bridge the wide gap of the 71P area from the 71P20 level to the 71P50 level.

The course length will vary according to the involvement of the career management training, however, CONARC guidelines are for the courses to be between 8 to 12 weeks. The individual will be granted TDY by his commander for the purpose of attending the course and will return to his former unit when he completes it.

NCOES selection procedures will be through unit commanders. They must ensure that enlisted personnel with potential leadership qualities are identified and programed into the basic course at the appropriate point in their careers.

Prerequisites are that the individual be an enlisted member of the active Army or of a Reserve Component in grade E–4 or E–5. The candidate must have already demonstrated leadership potential for middle grade noncommissioned officer positions. Selected E–3s possessing outstanding potential as identified during AIT will fill approximately 25 percent of the available quotas for the course. Each selectee must be MOS qualified in an MOS served by the pertinent course. The service re-

maining requirement upon completion of the course will be in accordance with paragraph 11–2, AR 614–200.

The promotion policy for the NCOES basic course provides for an individual's promotion by school commandants to grade E–5, for academic achievement, provided he graduates number one in the class and is in grade E–4 at the time. An E–3 attending the basic level course will be promoted to E–4 on satisfactory completion.

The award of 42 promotion points for successful completion of the basic NCOES course has been announced for all personnel. The multitrack ACMF courses are not MOS producing or ASI awarding. Rather they are career courses as defined in AR 351–1.

The objectives of the advanced NCOES program are: To prepare selected enlisted personnel in grades E–6 and E–7 to perform duty as noncommissioned officers in the grades of E–8 and E–9; to train them in appropriate supervisory skills; to increase both skills and confidence; and to instill a sense of pride and esprit de corps.

Emphasis in the advanced course will be on leadership skills and knowledge of subjects required to effectively perform duties as first sergeant, sergeant major, staff sergeant major, or comparable noncommissioned officer duties at the company, battalion, brigade or equal level of homogeneous units. This training will be oriented on the appropriate arm, service or ACMF to produce ultracompetent senior noncommissioned officers.

The emphasis during training will be on the philosophy underlying Army objectives and Army systems. Training will be directed toward a firm comprehension of the noncommissioned officer's role in combat, combat support and combat service support units.

The advanced air traffic management courses will be developed along the same multitrack concept as the basic.

Phase I—Career Subjects

Phase II—MOS Skill Subjects (93L50, 71P50)

Phase I will be taught concurrently to both MOSs with Phase II separating into the career management field of the ATC facility chief and flight operations sergeant.

The length of the advanced course will vary according to the involvement of the career management training. It will follow the same guidelines as for the basic; i.e., 8 to 12 weeks in duration.

Selection procedures, to be developed by the Department of the Army, will ensure that noncommissioned officers with the highest performance potential are programed into the advanced NCOES courses as part of the centralized career management function. Selection and quotas will be on a best qualified basis and will be controlled by DA.

Prerequisites will require that an enlisted member:

- be in the active Army or in a Reserve Component in the grade of E–6 or E–7 with not more than 15 years of service;
- possess leadership potential;
- have a minimum service remaining upon completion of the course in accordance with paragraph 11–2. AR 614–200; and
- be MOS qualified in one of the feeder MOSs to the pertinent course.

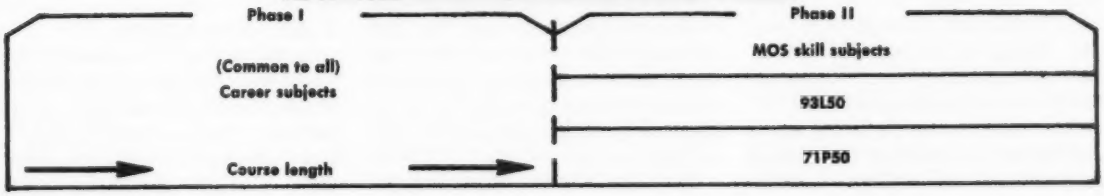
Although no promotion points will be given (at this time) for attendance to the advanced NCOES course, it is probable that personnel will not advance beyond grade E–7 without having completed this course.

The basic NCOES course will be initiated this year, the first class scheduled to start on 26 June. The advanced NCOES program is slated to begin during the third quarter of fiscal year 1973. With the implementation of these NCOES courses, NCO educational and professional development will be placed in its proper perspective in developing a truly professional corps of noncommissioned officers.

NCOES—ADVANCED LEVEL OBJECTIVES

- To prepare selected enlisted personnel in grades of E-6 and E-7 to perform duty as noncommissioned officers in the grades of E-8 and E-9
- To train in appropriate supervisory skills
- To increase skills, confidence and a sense of pride . . . esprit de corps

ADVANCED LEVEL MULTITRACK COURSE DESIGN



Horizontal Enrichment

An improved educational program is a major accomplishment, especially when it can be implemented with existing facilities. The Aviation Maintenance Officers Course conducted by the Ft. Eustis Aviation Maintenance Training Department has come up with such an improvement. Entitled horizontal enrichment, the program exempts the experienced student from having to sit through classes covering material with which he is already well versed

CW3 Robert R. Vaughan Jr.

THE AIRCRAFT Maintenance Officers' Course (AMOC) at Ft. Eustis, VA, has long presented a problem to the developers of the program of instruction of the course. It is open to commissioned and warrant officers, and it is not unusual to find a second lieutenant fresh from his basic course sitting beside a W–3 who has over 15 years of aircraft maintenance experience. A W–1 just out of flight school may find that he is in a class with a major who has had maintenance company command time. The problem is in the development of a universal program of instruction that would benefit all.

How does one present instruction in the T–53 turbine engine to a class in which at one end of the spectrum there are people who aren't even sure what a turbine engine is, while at the other extreme there may well be people who contributed through EIRs and DA Form 2028s material which has subsequently been incorporated into the instruction itself?

The answer may lie in self-pace. Self-paced education is the darling of academicians today. Articles appear in educational journals, learned scholars attend seminars and educators appear on radio and television talk shows to discuss its merits. It is not a panacea but it does offer many exciting possibilities.

There are many avenues which self-paced instruction can take. The most ideal path is to present the instruction in such a fashion as to allow the individual student to control the rate. Like a self-feeder in a poultry operation, every kernel of education absorbed is replaced immediately by a new kernel, and the rate of replacement is controlled solely by the rate of student absorption. This can be very slow or very fast without sacrificing the total, and the end result is identical knowledge garnered by all students fast and slow alike.

The obvious advantage to this system is that it prevents the fast students from becoming bored by redundancy and allows the slow students to take as much time as is required to ensure mastery of each subject.

But there are disadvantages. One disadvantage is in the fact that outside of mastering the subject early, there is no program of *enrichment* beyond the total learned by the whole class. And completing the class ahead of the program is not always advantageous in the Army, since in a recent experiment with the project at one Army service school those who finished up to 2 weeks early were given additional duties such as cutting the grass in order to "make work" and keep them busy. This is hardly an incentive for fast learning.

Another disadvantage of this program is the equipment required to make it truly effective. Individualized booths, programed texts and teaching aids, such as self-regulated video tapes and computer responses to student efforts and inquiries, would create the optimum teaching situation. And, this equipment would require a budget of fantastic proportions.

A second path of self-pace is a program which takes into consideration the disadvantages of the first and effects a compromise. It is a program of vertical enrichment. Vertical enrichment elimi-

nates to some extent the requirement for the equipment by acting as an adjunct to more conventional instruction. But, just as in the ideal self-paced program it recognizes the fast learner, thus providing *enrichment* beyond that received by the overall class. For example: The class receives instruction on the aforementioned T–53 engine. The class learns that it is a turbine engine, that it uses a special oil and fuel, and that it is utilized on various models of the UH–1 Huey helicopter and the OV–1 Mohawk airplane. The fast learner will advance into the various components of the engine and be given a much more indepth knowledge. It is knowledge beyond that required for the bare completion of the course but definitely an *enrichment* for the student. He is provided the instruction through extracurricular handout material, such as programed texts, etc. Since the participation is much smaller the amount of equipment required is greatly reduced.

As you can see, there are several advantages here. There is the prevention of boredom for the fast student while still allowing the average, and the slightly below average, student time to absorb the material required to reach the class goal. And, it solves the problem of what to do with the fast student who would find himself with time on his hands (and possibly a lawn mower in them) by completing the course earlier than scheduled. Finally, it provides *enrichment* for the fast student above the class goal.

But, and this is the major drawback of this system, the enrichment is gained by the participant only. The ideal solution would be one in which there is enrichment not only for the participant but also for the entire class. An example of this is in the old oral book-report concept of grade school. Johnny is given a book report requirement and he selects *Farmer Brown's Wonderful Garden Pets*—or something similar—perhaps two grades below the class reading level. Andrew, on the other hand, selects *Gulliver's Travels*. The class is thus *enriched* by the oral book report rendered by Andrew. Although Andrew was the biggest gainer, the rest of the class benefited from the fruits of his labor.

And that leads us to the method of self-pace instruction being used in the AMOC—the method referred to as *horizontal enrichment*.

Horizontal enrichment has all the advantages of vertical enrichment, but it also benefits the other members of the class as well as the participant. It derives the term "horizontal" from the fact that the program in which the advanced learner participates is an adjunct program to, and not a building on of, the basic instruction.

In the strictest sense the horizontal enrichment program as conducted by the Aviation Maintenance Training Department is not a self-paced program of the standard type. It is, instead, a program which is designed to relieve the

experienced student from the necessity of having to sit through classes in the areas in which he has expertise rather than accelerate the rapid learner through them.

As the AMOC students arrive they are asked to fill out background sheets with particular emphasis being placed on their prior experience in maintenance in three subject matters: UH–1, CH–47 and fixed wing. These background sheets are studied by faculty members and those who show sufficient background are tested in their field of expertise. (An exceptionally well-rounded student may be tested in all three subjects.)

The validation tests are designed to authenticate the student's experience. They are given during the student's first introductory hour to the technical subjects phase of AMOC and graded immediately so that the students may have the results as quickly as possible.

Once the student's experience has been validated and he is accepted as a candidate, he is given the opportunity to select a project which he may develop in lieu of attending classes in the subject matter in which he was found to be exceptionally qualified. The projects are varied; the only requirement is that it relate strongly to the subject in which the student was validated.

Every effort has been made to provide maximum assistance to the student during his project. He is given access to the Transportation School Library which has exceptionally fine technical material available. He is provided with a "quiet room" and encouraged to make telephone calls to research his project to USAAAVS (formerly USABAAR), Bell or Vertol helicopter companies, or anyplace necessary. He is provided with a liaison officer who will give all the assistance of the Aviation Maintenance Training Department. He is relieved from classes during the period of instruction covering his field and is left to his own devices, working with assistance when requested but without supervision.

Just exactly what type of projects do the students select?

The first one dealt with the UH–1 input quill oil seal and the student participant made contact with the factory engineers at the Bell helicopter plant as well as other agencies concerned. He presented the findings of his project in the form of a staff study, and then gave an oral presentation to the rest of the class, thus providing class enrichment from his project. This student also made a video tape which has been shown to subsequent classes, providing additional enrichment even beyond the original scope. Many of the students' projects are of a nature that would be of interest to people throughout Army aviation and, thus they are being encouraged to develop their works into articles for the AVIATION DIGEST.

How does the student participant in the program fare in his academic career achievement? In particular, what about the honor graduate? If he is relieved from taking the exam in his area of expertise, then he may be penalized since this exam obviously stands to best improve his overall average. The honor graduate system of recognizing the student who achieves a grade average score of one-hundredth of a point higher than his nearest competitor is a system of questionable value but, nonetheless, one to which the Army is inexorably committed. Because of this the participant in the horizontal enrichment program is given two options: he may take the exam offered covering his area of expertise, or he may have his project score fed back into the system as part of his course grade. He may even take the exam and do the project, and then select the higher score. The hope is, however, that participation in the program will in itself assume a status comparable with that of being an honor graduate.

There are many advantages to this program, not the least of which is economics. In a time of tightening budgets, an innovative educational program which can be implemented with existing facilities is a major accomplishment in itself.

Of course there are disadvantages to this system. But no good purpose is served in belaboring the disadvantages. Rather, we should be concerned with the existing faults in the administration of the program with emphasis on what action is required to correct these faults.

The greatest shortcoming of the existing system is the method of validation. As it stands now the validation tests are merely vehicles to judge recall. Rote memory stimulation of obscure facts and figures give only a very poor indication of the candidate's actual knowledge. A system of validation is needed which can provide us with acceptable candidates without having to rely on the flash card memory system of testing. But this requirement is recognized and an improved validation system is being actively sought by the administrators of the program.

The other problem currently facing the candidate is the lack of awareness of the program throughout the Army and the aviation industry. Until there is complete awareness of the program, reaction to the student's inquiries and requests is not as comprehensive as might be desired. This is a problem that will be alleviated, however, as the program becomes better known.

With the development of the horizontal enrichment program the U. S. Army Transportation School at Ft. Eustis continues to live up to its motto: *Through Learning We Progress.* In science, progress.

That They May Live

Continued from page 7

protection of medical evacuation is a universally accepted system of identification which is commensurate with the capability of weapons systems to engage and destroy aircraft.

Fortunately the International Civil Aviation Organization (ICAO) has developed and prescribed air traffic control (ATC) systems and equipment in use wherever civil aviation flies. Thus the basic systems and hardware are available off the shelf to most countries. A very much improved and feasible universal identification system can be devised using existing ICAO air traffic control procedures and equipment.

The basic guidelines for the identification systems which are to be proposed by the U. S. delegation include:

• Medical aircraft should be equipped with very high frequency (VHF) and ultra high frequency (UHF) radios. Using international distress frequencies to be allocated by the International Telecommunication Union, radio links may be used to communicate with ATC and with the adverse party giving verbal identification and intentions.

• Visual identification signals to include (1) the conspicuous display of the distinctive Red Cross emblem on a white field and (2) flashing blue lights, or some other equally effective light system, which should double or triple the range at which medical aircraft can be identified by visual means.

• A beacon transponder, similar to the equipment now used by ICAO ATC. As a basis for identification procedures international standards and practices contained in Volume I of Annex 10 to the Convention on International Civil Aviation should be used. This involves the transmission of an agreed mode 3A code reserved for medical aircraft which can be received and identified by ATC ground radars and military ground based radars.

• Medical aircraft equipped with the above-mentioned means of communication shall be given a common call sign to be used as a prefix to the aircraft number. A collective international call sign should be approved and assigned by the International Telecommunications Union.

• In order to accommodate the identification system to changing technology, a standing joint international civilian-military authority should be established. The group should be empowered with authority and means for recommending to the appropriate agencies the revision and improvement of existing humanitarian air ambulance procedures.

The Concept of The U. S. Draft Protocol include:

• Protected aircraft are any belonging to or under the control of the military service of a party to conflict whenever used solely in the performance of a medical mission. These aircraft may be permanent dedicated medical aircraft which are protected at all times, or they may be temporary medical aircraft protected only while performing a medical mission. They may be owned by military services, international organizations or civil airlines, but they must be controlled by the military service of a party to a conflict. Temporary medical aircraft may display the Red Cross emblem and transmit the distinctive signal only while performing a medical mission.

• The safety of medical aircraft engaged in battlefield evacuation can never be absolute, yet the lifesaving potential of prompt evacuation from the battlefield is so great that risks involved should be taken if the risk of misidentification can be reduced to acceptable limits by the use of improved identification systems.

Recognition of the need to provide for protection to temporary

The versatile UH-1 Huey has been the backbone of battlefield aeromedical evacuations in Vietnam

In Vietnam aeromedical evacuation helicopters have saved tens of thousands of lives through the rapid evacuation of wounded directly from battlefield to surgical hospital

medical aircraft involves particular risk of abuse in the battle area. A helicopter is probably most vulnerable as it is lifting off. Thus an enemy may be particularly suspicious if a helicopter lands at a fire base loaded with supplies and replacements and then quickly converts itself to a medical aircraft evacuating wounded.

Accordingly, the U. S. proposed draft provides, "Aircraft operating in areas in which opposing ground combat forces are in hostile contact with each other shall benefit from the respect and protection extended to medical aircraft only if they serve as such both in approaching and departing from such areas and during their stay in such areas."

In order to be protected, the medical aircraft must conspicuously display the distinctive emblem. If feasible, it should also transmit the distinctive light or radar transponder beacon signal.

The UHF and VHF international distress frequencies reserved for the use of communications relative to medical aircraft provide a channel of communication under which those employing the aircraft can, if they wish, notify the enemy of information which will aid in the identification of medical aircraft operating in the combat zone.

Medical aircraft operating in battle areas must conform to guidelines applicable to all medical aircraft. These include, "medical aircraft [which] shall be neither armed nor reconnaissance configured and shall contain no armament other than small arms and ammunition belonging to the wounded and sick . . . and such small arms as may be necessary to permit the medical personnel and crew members to protect themselves and the wounded and sick.

"As far as is practicable under the circumstances, the medical mission shall be performed in such places and in such a manner as to minimize the risk that the conduct of hostilities by combatants may imperil the safety of medical aircraft."

The last mentioned provision is recognition of the principle that although medical aircraft and medical personnel may not be the object of attack, they are not protected against the danger of incidental damage resulting from an attack against a military target if they are too close to that target. It is moreover forbidden to use military aircraft as a shield to protect a military target.

The most difficult problem of providing legal protection for medical aircraft is the determination of circumstances under which protected overflight across enemy territory is to be permitted and, if so, a determination of the guidelines to prevent abuse. Although rare, the problem must be faced in relation to evacuating wounded from a besieged area or an established airhead.

The present law prohibits such overflight "unless agreed otherwise." The U. S. proposal does not require express agreement but in effect a tacit agreement as to flight plan for overflight results.

The U. S. draft provides that medical aircraft shall continue to enjoy the respect and protection under the protocol "while flying

over territory physically under the control of an adverse party." The party controlling the aircraft, however, has the burden of complying with certain specific procedures. The key procedure is, "The party employing medical aircraft shall provide to the party physically in control of the territory over which the medical aircraft will fly, timely notification, including the following:

- The aircraft involved are medical aircraft;
- The description and number of aircraft involved;
- The time, altitude, and route of travel of the aircraft, and
- Any other information which will aid in the identification of the aircraft.

"The party physically in control of the territory . . . will *acknowledge receipt* of the information . . . and may require reasonable alternative altitudes and routes of travel, and the party employing medical aircraft shall comply with such requirement."

The foregoing provisions really amount to prescribing a procedure whereby a flight plan is tacitly agreed on using international distress frequency radio channels reserved for this purpose. Because timely evacuation may be paramount, the adverse party must permit the flight at the time prescribed, although it may vary the altitude and route.

Other measures calculated to prevent abuse, and induce tacit permission for such overflight are:

- Medical aircraft, while engaged in such overflights, shall not carry cameras or other intelligence-gathering equipment or intelligence personnel (other than those who are wounded and sick).
- Overflying medical aircraft may be ordered to land for inspection and they are required to comply with such order. If inspection establishes that it is in fact medical aircraft it shall be permitted to continue its mission. On the other hand, if inspection shows that the aircraft is guilty of a violation it may be seized and the crew and passengers would be treated as prisoners of war or in accordance to whatever status they are entitled under the 1949 Geneva Conventions.

On 29 November 1971 Admiral Alan B. Shepard, U. S. representative, addressed the Human Rights Committee of the United Nations General Assembly on Human Rights in Armed Conflicts. In part he said, "Experience in recent conflicts shows that there is a great enhancement of the chance of survival if a wounded person can be promptly evacuated and treated. This makes urgent the establishment of proper safeguards for medical transports, such as helicopters and fixed wing aircraft."

The U. S. draft proposal is a feasible alternative to the prior agreed flight plan. At the very least it would provide the mechanism and the communication channels for arriving at a tacit or actual agreement on overflights of territory held by the adverse party.

Of course, little can be expected unless there is confidence among the parties that there will be good faith observance of the rules. Subject to some exception, the experience of the Red Cross for over 100 years has been that its emblem and protection of the wounded and sick in war have been respected. The value represented by the conventions concerning the wounded and sick are shared by all countries and parties to a conflict. There is good reason to hope the air ambulance for all wounded and sick will be free to perform its essential humanitarian services from the present restraint of an agreed flight plan.

Aviator Support To A Counterinsurgency War

Continued from page 11

information obtained from the computer runs.

Units were not always deployed to Vietnam in even monthly increments. Rather than spreading them out evenly they were often sent as quickly as men and materiel could be combined, training accomplished and overseas transportation provided. In October 1967 about 800 aviators deployed with various aviation units. This large group deployment, coupled with the usual individual requisitions, necessitated a replacement requirement 1 year later of almost 1,200 aviators for the month. This was an unusual requirement with most months requiring substantially fewer aviators. Although Vietnam inaugurated an infusion program and used other personnel policies in an attempt to ease the situation and spread the flow of replacements, it remained a problem for several years. The training base output for new aviators hit its programed high of 610 per month in the summer 1968. The uneven replacement flow created additional difficulties in fully utilizing this large group immediately after graduation.

There were also problems encountered in attempting to obtain two tours in Vietnam for all aviators. After graduation from flight training, aviators incurred a 3-year commitment. However, after a 1-year tour in Vietnam most aviators were returned to the training bases as instructors where they were stabilized for 18 months. Considering other factors such as normal intransit leave, many aviators had only 3 or 4 months active duty remaining on their obligation before they were eligible to return to Vietnam. Thus, in most cases second tours were provided from within the relatively small base of career aviators. However, in an attempt to secure the maximum number of these initial obligation aviators and attempt to elongate the time between tours for all aviators, personnel were assigned to Vietnam as individual replacements if they had 6 months remaining on their active duty commitment, or they could also deploy with units if they had only 3 months remaining when they arrived incountry.

Vietnam requirements and the training base accounted for most of the Army's aircraft fleet. Unless aviators were assigned to the training bases, they were faced with the problem of remaining proficient after they returned from Vietnam. At that time flight waivers were not authorized and some aviators were forced to travel great distances just to meet minimum requirements. However, some overseas commands possessing older aircraft not used in Vietnam were faced with the opposite dilemma. They had aircraft and no aviators. There was a general tendency in these commands to reduce aviation spaces and turn in aircraft. This later proved to be a significant problem when aviation resources became more plentiful. Commands later found they could modernize their fleet and obtain the full authorization of aircraft, but they did not have the aviation spaces to support them.

Another continuing problem facing aviation planners was maintaining officer input into flight training. Initially, aviation was limited to only seven officer branches and the warrant officer branch. (Subsequently, the program was enlarged so that all commissioned branches were authorized to share in the program.) A sustained output of 610 aviators a month, which was programed for FY 69, required that nearly 9,000 personnel be placed into flight training. This was a significant drain on those few branches authorized aviators. Some had to place one out of every four of their second lieutenant accessions into the program just to meet the minimum yearly officer requirements.

Some 60 percent of the aviation training input consisted of warrant officer candidates, but they could not be used at the complete exclusion of commissioned officers. There are many requirements that must be filled by commissioned aviators for which warrant officers are neither trained nor qualified. As there was very little difficulty securing sufficient numbers of warrant officer candidates, any officer shortfalls were quickly replaced by warrant officer candidates so that training bases would be utilized to maximum capacity.

Regardless of recruiting efforts there continued to be a shortage of commissioned officer aviators in the lower grades. A program was, therefore, initiated to provide direct commissions for warrant officers. This was to prove extremely successful in providing additional incentives and career opportunities for a good number of outstanding warrants.

Attaining an adequate aviator strength was based on the assumption that there would not be drastic personnel losses at least until the increased training output could be realized. The attrition loss from all causes during the year ending June 1966 was about 9 percent of the total inventory. During the next few years it was to increase to 11 percent of the aviator force. As this figure includes all grades, its implication is not immediately obvious as the majority of the losses occur after the initial obligation.

Additional steps were taken to improve retention rates. For instance, service attractiveness for

warrant officers was further increased by initiating a progressive career development program incorporating intermediate and advanced branch schooling. Nonregular aviators were offered 2 years additional active duty beyond the time they would usually retire. Aviators were not automatically allowed to go off flying status at their own request. The only way to leave the program was for medical disqualification, fear of flying or unsuitability for the program. Reserve Component aviators on flight status were offered an opportunity to volunteer for active duty. Aviators who had been retired for no more than 5 years were also given the option of returning to active duty.

Of importance also to aviators was the realization that career development (nonaviation assignments) would be resumed as quickly as possible and that every attempt would be made to reach a 25-month repetitive tour interval. All aviators realized that they would be assigned to Vietnam for at least one tour and many would be called upon for repetitive tours with very little time between the tours. Upon returning from Vietnam many aviators were placed in units activating for deployment to Vietnam 1 year later.

All that most aviators desired was to be treated equitably with their fellow aviators. They also desired to remain competitive with their nonaviation contemporaries. Aviators are proud to wear the wings and cognizant of their accomplishments, but they do not desire their career jeopardized by extenuating circumstances or adverse personnel policies. It was, therefore, extremely important not only for retention purposes but also for morale that the Army live up to its promises and ensure that aviators be given equal career opportunities.

The extent of second tour assignments to Vietnam was significant. Helicopter companies were among the units to deploy to Vietnam as early as 1962. This was considerably ahead of the large U. S. buildup which commenced in 1965. Because of factors such as the early deployment, relatively low aviator initial strengths, rapid Vietnam buildup, requirement for experienced aviators in Vietnam and the long lead time to train substantial numbers of new aviators, many were returned to Vietnam for repetitive tours.

From 1962 to mid-FY 71 a total of 8,028 aviators were assigned two tours. Of this number about 18.5 percent were volunteers. It must be realized that if aviators had not volunteered they would still have been required to return for an additional tour.

While the time between tours never fell below an average of 22.4 months, this figure by itself is not particularly descriptive of the problem encountered. Because of the significant number of personnel in the training base who were stabilized for 18 months, a great number of aviators were returned with only 12 months between tours.

The substantive increase to the training rate greatly relieved the aviator shortage and restrictive assignment policies were eased. Even as early as FY 67 career branch schooling for aviators was resumed on a limited basis, and there were a few officers in nonaviation related duties. Beginning in 1969 significant numbers of aviators were released for these assignments. Throughout the Vietnam buildup, however, there was never an attempt to limit the number of aviators or restrict their attendance at any of the senior service colleges or the command and staff colleges. Personnel planners fully realized the importance and benefits to be derived from these schools.

Commands were once again reconstituted with aviators. Initially, when aviators returned from Vietnam they were assigned to commands consistent with priorities and availability of aircraft. However, as they became available in greater numbers, they often ex-

ARMY AVIATION EXPANSION

FY	Total Aviators	Training Output	Aviator Authorization	Total Aircraft	Ratio of Aviators to Aircraft
62	6,788	652	8,722	4,738	1.43
63	7,294	877	9,500	5,047	1.44
64	8,276	1,283	10,459	5,532	1.49
65	9,074	1,432	10,441	6,203	1.46
66	9,650	1,536	14,307	7,360	1.31
67	12,908	3,907	17,917	8,781	1.43
68	16,735	5,345	23,725	10,527	1.57
69	22,429	7,561	23,960	11,625	1.93
70	24,153	6,981	24,431	12,166	1.98

ceeded the number of aircraft which could support them. This placed a heavy strain on available aircraft and often resulted in misutilization of personnel, particularly among warrant officer aviators. While officers can be assigned against a variety of positions, warrant officer aviators are specialists and it is difficult to assign them out of their field.

It has been said that it is easier to build than to tear down. This is particularly true for Army aviation in drawing down the force in Vietnam and preparing for the unknowns of the future.

The importance of mobility in fighting a counterinsurgency war has been firmly established. Helicopter units were among the first in Vietnam, and they will probably be among the last to be withdrawn. Aviator training is geared to the Vietnam requirement. Long range forecasts, therefore, play an important part in determining the aviation training rate. Because of the long lead times involved incountry strength and replacement requirements must be established well over a year in advance.

Additional problems affecting aviator training such as funds, spaces, personnel allocations and equipment must be resolved well in advance of any fiscal year. If a decision is reached to reduce training based on programed incountry strength, and those anticipated reductions never materialize, it takes time to increase the force. If, on the other hand, training is not reduced and the withdrawal is greater than originally programed, there are a good number of aviation school graduates who must be diverted elsewhere.

Many important lessons have been learned from experience in Vietnam. They must not be forgotten if aviation is to remain a viable force responsive to the requirements of the Army. In any future contingency the Army may not be afforded the opportunity of building up an aviation force over a period of time. Because of the long lead times required to increase aviator strength, a substantial supplemental aviator force will be required during peacetime. The costs associated with maintaining this force will be minimal compared with the loss of preparedness if the force is skeletonized.

Army aviators must be immediately available and responsive in sufficient numbers to meet initial wartime requirements. During peacetime most of these aviators can be absorbed into the force structure in nonaviation positions. The Army, which is becoming increasingly airmobile conscious, can benefit from these assignments by utilizing the aviators' skills, training and experience in many command and staff assignments. It must be realized that this force will mature over a period of time and new aviators must continually be trained. Any interruption of aviator training will cause future grade gaps and imbalances.

The exact size of the supplemental force is debatable; however, this force must be established in addition to TOE/TD aviator authorizations. The size of the supplement force is a function of three considerations:

• First is the problem of the size of the initial deployment force requirements. There must be enough aviators available to man this force without seriously impairing the combat effectiveness of other commands.

• Second, tour intervals in the combat zone and the time between tour policies play an important role in determining the size of the sustaining force. For instance, to sustain a force of 8,000 aviators who are in a combat zone for 12 months and also be able to maintain a 2-year interval between tours, calls for a total force of 3.2 times the committed, or in this case 25,600 aviators (the .2 includes the requirement for personnel in a transient, patient or student status).

• Third, there are physical constraints which limit surge training. These may take the form of facilities, available aviators, aircraft, airspace and the like. Therefore, a residual capacity to surge must be maintained which will help to reduce the long lead times required to increase aviator output. Experience has shown that it is desirable to have about 1.5 trainees for each trainer. In other words, to support a training load of 7,200 students requires about 4,800 trainers.

The size and employment of the warrant officer force is also important. Because warrant officers are specialists trained primarily to fly aircraft, the training of more warrants than are required to fill supportable commitments and spaces must be avoided. This is in no way intended to downgrade the warrants' significant contributions to the aviation program; it is merely intended to point out that sufficient aircraft must be available to support them or there will be an unemployment problem.

Aviation units are authorized what I consider to be the minimum number of aviators essential to do the job properly. Units are usually given only enough aviators to fill the cockpit plus about 25 percent for supervisory and overhead personnel. In company size units this would usually include no more than the commander, executive officer, operations and supply and maintenance officer; the remaining are cockpit aviators. While Vietnam never attained 100 percent of its aviator authorizations for various reasons, I believe that combat units should be manned at full unit authorization.

Prior to committing a force in combat, determination must be made as to the extent of the tour. Although Vietnam remained a 12-month tour there were periodic

REPETITIVE VIETNAM TOURS

1964 – Jan 1971

	Involuntary	Voluntary	Totals
12–15 months	395	608	1,003
16–18 months	668	238	906
19–21 months	1,169	202	1,371
22–24 months	1,324	192	1,516
25–30 months	1,590	124	1,714
30+ months	1,397	121	1,518
Totals	6,543	1,485	8,028

suggestions that the tour length be increased. An 18-month tour in a combat situation such as Vietnam is entirely too long; however, if the 3-year aviator obligation remains, the tour length should be increased to no more than 15 months. This would better use those aviators who cannot be utilized on more than one tour and lengthen the time between tours for all aviators. Regardless of the length specified once established the tour policy should not be extended as this would create adverse morale and welfare personnel problems.

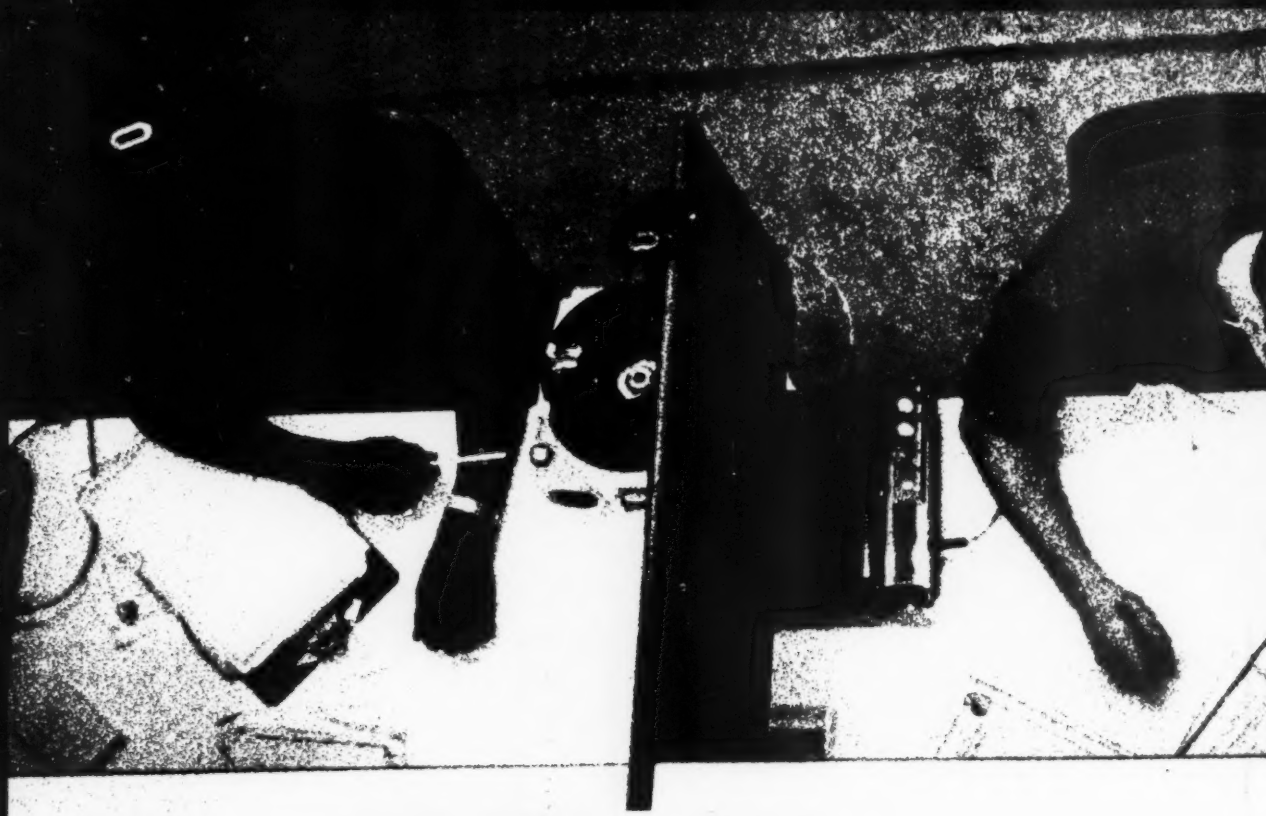
As an alternative to longer tours, consideration also should be given to increasing the aviator obligation to a 4-year commitment after graduation from flight training. This would allow aviators to be given two tours in a combat zone and the 1 year incountry tour could be maintained. This again should not be changed after substantive buildup of the force has been initiated. Any change may cause a decrease in the number of personnel volunteering for aviator training at a time when they are needed most.

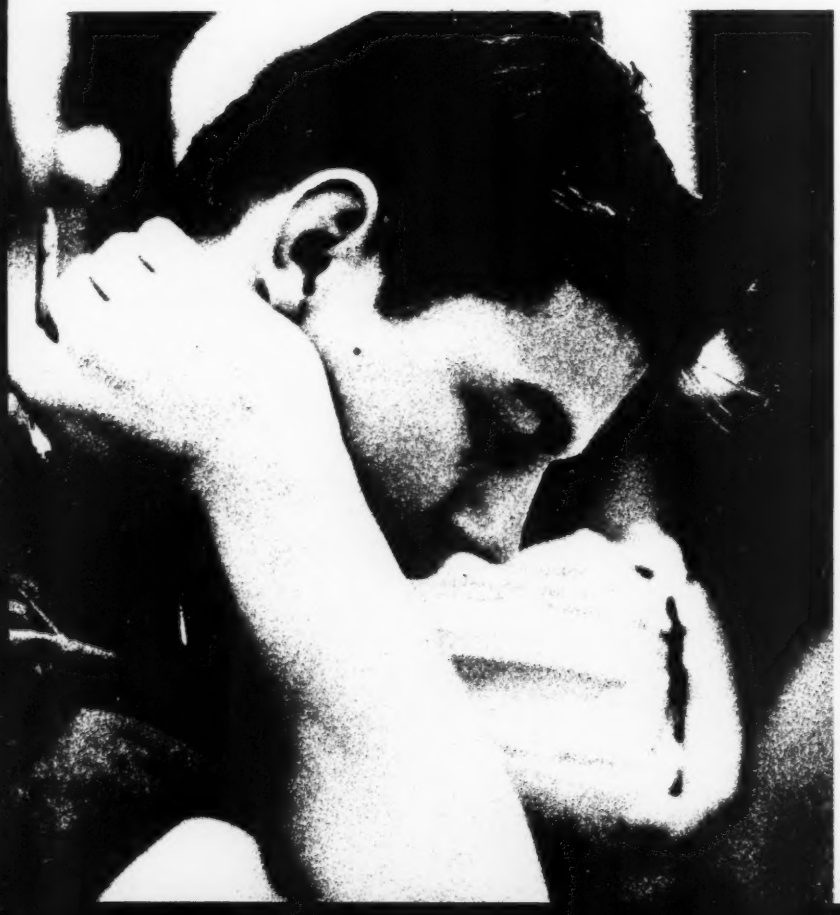
There is a continuing requirement to update and improve the data available to aviation planners. A system must be devised whereby information available to the Department of the Army is verified or changed by the individual and personnel officer in the field. The present system is dependent upon units initiating a change and then that change is sent through the mail where it, hopefully, is received at Department of the Army. There is no ready way for persons in the field to verify that the change has actually been posted. Valid decisions require valid data, therefore, information must be accurate.

Of utmost importance to many aviators is the question, Has my career been jeopardized by assignment policies which were initiated as a result of the Vietnam buildup? The question cannot be answered with an unequivocal yes or no. Actions were taken at Department of the Army level to notify all commands of the policies. A memorandum for record signed by the director of officer personnel was placed in all majors' and captains' personnel files. The purpose of the memo was to ensure that selection boards and career branches were cognizant of the policies and that the aviators were not to be penalized for certain unusual personnel actions which may have affected them.

Today the aviator's record of promotions and attendance at command and staff colleges and senior service colleges is usually equal to or better than that of his nonaviation contemporary. The opportunities for aviators have never been greater but the future is up to each individual. In the final analysis the record of performance is a major determinant for success. Personnel must excel in every duty they are given to perform. If previous personnel actions precluded aviators from a normal career development pattern, aviators must do everything within their power to secure competitive assignments. Aviators must not rest on their past laurels; they have to prove themselves today if they are to remain competitive tomorrow.

With the anticipated reduction in the Army's ground forces it is even more imperative that the mobility of our forces be increased through Army aviation. It is also of utmost importance that the lessons of Vietnam not be forgotten. In the future there may not be the time to build the aviation force which is so essential to the successful accomplishment of the Army's mission.

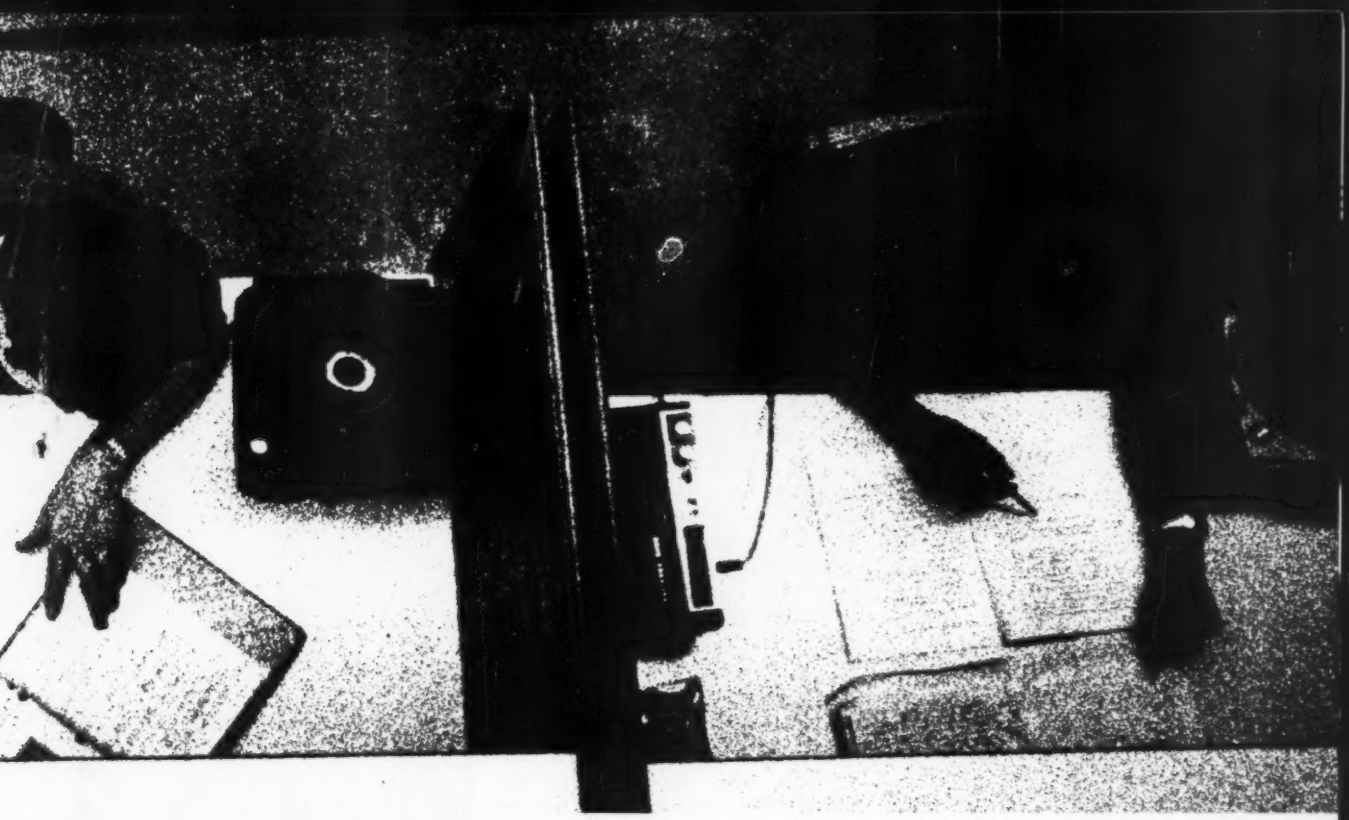




MAI

THE UH–1 HUEY Maintenance Specialist Course (MOS 67N20) being taught at the U. S. Army Aviation School (USAAVNS), Ft. Rucker, AL, has been adapted to the self-paced learning concept, a progressive approach to vocational training.

As a student begins the course he is given an orientation on the self-paced learning concept and



NTENANCE TRAINING

Goes Self-Pace

The author is chief of the Enlisted Training Branch, Department of Maintenance Training, U. S. Army Aviation School, Ft. Rucker, AL. He points out how a new training program based on the self-paced concept of learning is upgrading the quality of maintenance training while reducing instruction costs

Captain Norman J. Otto

how to use the training aids available to him. He then begins the course and progresses at his own learning rate.

Each student has a projector and a tape player at his student carrel (individual booth) to become familiar with the basic information required for each block of instruction. As the student learns the material required, he goes to the practical exercise (PE) area to apply his new knowledge in a specific job oriented task on a UH–1 Huey training aid. In the practical exercise he also becomes familiar with the use of his technical manual.

A 2 hour progress evaluation follows the PE in which he demonstrates to the instructor his proficiency. If a student or his instructor feels that he has not achieved complete comprehension of the material, review periods are provided and the student is retested on the material with which he has had trouble. This is repeated until the student knows the material and can demonstrate 100 percent proficiency. The level of performance demanded of the student in the twelve progress evalua-

tions and six major exams is 100 percent accuracy. Although the standard appears high, the Department of Maintenance Training (DOMT) instructors point out that there is no 70 percent installation on an aircraft. *It is either right or wrong.* Because the proficiency standard is 100 percent the student receives a GO/NO-GO grade rather than a percentage grade in the 67N20 Maintenance Course.

Supervisors at the Aviation School's DOMT feel that the self-paced learning concept recognizes student differences and incorporates individual practical exercises that will produce a better end product. Training analysis information sheets (TAIS) identify the tasks the student must accomplish. The self-paced lesson plans were developed from the tasks identified on the TAIS.

Self-paced training has two basic precepts. First, each student is an individual possessing his own learning rate and potential. Secondly, each student is a mature individual who is responsible for his actions. Since each student is treated individually it is essential that each student have his own "instructor." Since it would be impractical to have one live instructor per student, other media are used. A tape player (one per student) with a matched slide projector replaces the live instructor in providing oral instruction in the conference portion of the training. As the student gains knowledge of his subject matter, he progresses through the course by means of his student guide which leads him from the oral instruction to the practical exercise.

The student guide induces the student to implement what he learned from the oral instruction, add what he reads in the technical manual and physically perform the task required.

Individual instruction through the use of tape recorders and slides (left) allows for complete comprehension of material. Proficiency standard is 100 percent as there is not a 70 percent installation of the pitch change link on the tail rotor of a Huey (above)

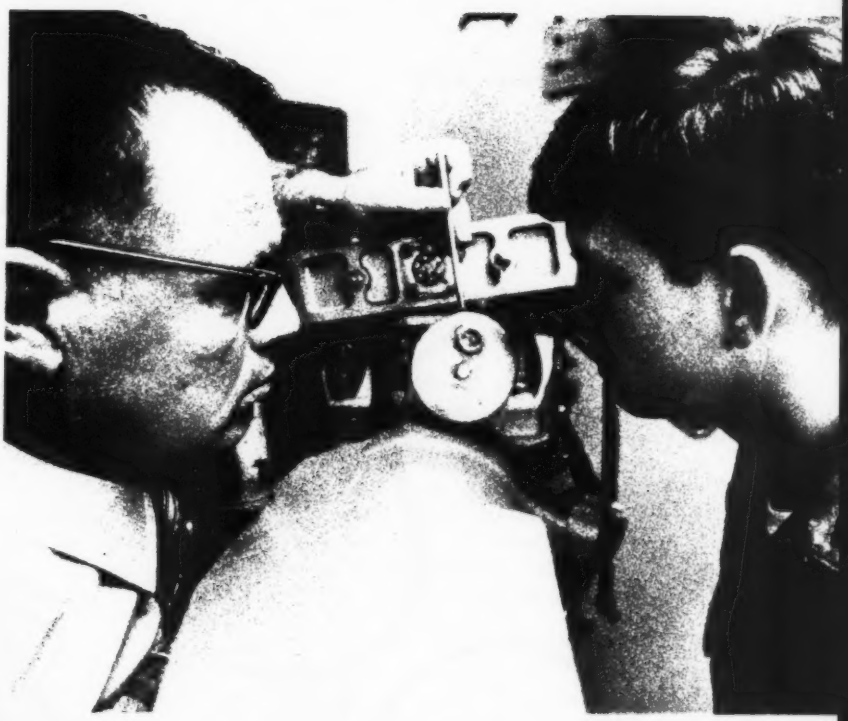
Approximately 25 percent of the instructional time is devoted to examinations which are performance type exams that actually test the student on his knowledge, ability and progress. The exceptional student will be able to progress much faster than the 231 hours programed and the slower student will be allowed to use the maximum time. Several advantages are apparent:

• *Decreased training time for each student.* The systems engineering eliminates duplication because each student will be able to progress at his own pace and there

will be no lost time by the students waiting for the rest of the class to keep up. The fast student will progress ahead of his contemporaries, complete the course and be in the field sooner, which will reduce training costs.

• *Improved student motivation.* The student has the opportunity to progress at such a rate that he will not become bored or fall behind. As the student accelerates he has incentive benefits; i.e., 3 day pass, additional training or early departure.

• *Improved utilization of training aids.* Since there are students in all phases of training simultaneously, each training aid may be used for several different practical exercises at one time.



Individual instruction is carried over to the practical exercise where the student physically performs task (below). About 25 percent of the instructional time is devoted to examinations which are performance type exams where the student receives a GO/NO-GO grade (right)

• *Uniform end product.* Every student will be required to successfully complete each task. There are two variables which may be utilized in training: the time required or the percentage of accuracy. In conventional training procedures the training time has been fixed and the percentage of success has varied with each student. Under the self-paced learning program for the 67N20 course the percentage of success is fixed (100 percent) and the training time varies with each student. He is graded only on a GO/NO-GO basis.

The goal of this self-paced learning program is to improve the quality of training without increasing the cost:

• Every student physically accomplishes tasks required for complete training.

• Each student progresses at his own best learning rate.

• Practical exercises where the student actually uses equipment are utilized as often as possible.

• Technical manuals are the final authority on every task. To complete the task it must be performed by the manual.

• The student's tasks are based on the systems engineered training analysis information sheets which establish the standards.

During initial implementation the 67N20 course of self-paced learning all of the goals were achieved. Student success has been extremely high and training time has been reduced. However, comparative evaluation from the field will determine the final success of the program. But since the student has accomplished each task in school, it is anticipated that the field evaluation will indicate a successful and comprehensive program.

Major Chester Goolrick

Sound Mind, Sound Body Sense

The Army is well aware that any dropoff in its airmen's mental or physical state is reflected in a corresponding slump in flying

ANYBODY WITH sufficient brains to fill an average-sized teacup takes care to have the family jalopy checked out at the corner garage before he takes off for Mosquito Beach on the family's annual vacation. If you have ever been stranded on the side of a freeway with a broken fanbelt, three thirsty kids, a dog which needs to be taken for a walk on a leash, and the density altitude high enough to go into orbit, you know what can cause men as unflappable as John Wayne to break into tears and tear their hair.

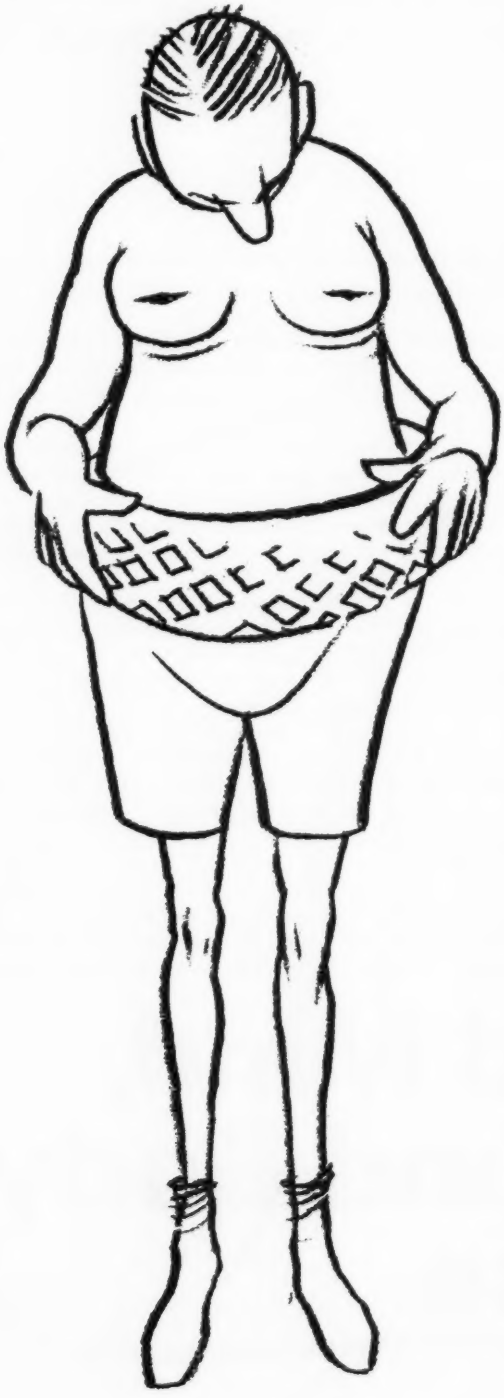
You don't head down the road in an automobile with elderly spark plugs and tires with just about enough rubber on them to cover a circus balloon. You have too much common sense plus a normal concern for the safety of yourself and your crew—in this case, your family. Right?

You also certainly aren't going to go aloft in any aircraft you *know* or even *suspect* has something wrong with it. Right again? Who wants to take that kind of chance when there are risks enough as matters stand? Not even Dumbo.

Okay, so let's move on to the next question. Have there been times when you have driven an automobile —or flown or serviced an aircraft—when you knew or suspected you might not be functioning yourself as well as you might be?

Hmmm.

The family head who starts for Mosquito Beach with his little brood might be at the wheel of a car just checked out by the maintenance men at Rolls-Royce. Pop himself is likely to have a King Kong-



sized hangover left from the going-away backyard barbecue party the night before. Or a toothache. Or worries about the overdue note at the bank. If he is lucky he will get to Mosquito Beach without running into a bridge abutment—or somebody else—but not before making a couple of wrong turns and having words with his wife which cause her to threaten to leave for Reno.

By now the point should be working its way into the open. It's a simple fact that people generally don't take the same care of, or have the same respect for, their own state of well-being that they accord the things they use—from safety razor blades to Army helicopters. Look at it this way. When you run across a hunter and his dog out in the field looking for coveys of quail it's a safe bet that (1) the dog and (2) the gun are in better shape than (3) the hunter. Not to mention the quail.

HOW SO?

There's a fairly simple explanation for this seeming contradiction. In the first place, almost nobody, including a trained athlete, is in absolutely first-class form all the time. The human body (and mind) in every normal person—and the doctors will tell you there is no such thing as a *normal person*—is an intricate mechanism with which so many things can go wrong that something is almost always slightly out of whack. Usually it is nothing more alarming than a bad case of sunburn or the toe you dropped the bowling ball on. Nothing likely to cause any marked upsurge in sales at the florist's shop.

No cause for alarm. Part of the business of being *normal* is the ability to make it to the office and get through a day's work when you are in the grip of a common cold or stomach collie-wobbles brought on by an extra helping of banana cream pie. Everybody has days when he would rather stay home and be served breakfast in bed, but gets up and goes out on the firing line just the same. And usually does a pretty good job at that.

If this is so, if you have to learn to expect that there will be on days and off days, why are the flight surgeons, the public health authorities and even President Nixon always harping on the need for physical fitness? Isn't it being just a mite overstressed?

Not by a long, long shot. The real truth is that too many people supposed to be in the prime of life, hale and hearty, and equal to the demands of daily living and working, aren't even up to standards considered normal. They have either got something wrong with them to the point where it *seriously* undermines their efficiency or, what is usually the case, have allowed themselves to go to seed to the extent that their highs

aren't as high as most healthy people's lows. Put them behind the wheel of an automobile—or at the controls of an Army helicopter—and they become a positive menace not only to themselves but to anyone else they happen to have dealings with.

Modern living makes it easy for anybody to go downhill physically, to accumulate a roll of blubber around his middle about the size of one of those newfangled wide-tread tires and to acquire a set of nerves like overtuned guitar strings. When old Dan'l Boone and his friends set out for Kentucky, they walked or rode horses, and not along any interstate freeway, either. If they needed food they hunted for it in rugged country and when they wanted to stay warm in winter they got out the ax and chopped wood. Life wasn't easy but it caused them to stay tough as rawhide, hard as a barrel of nails and as alert as a mouse in cat country.

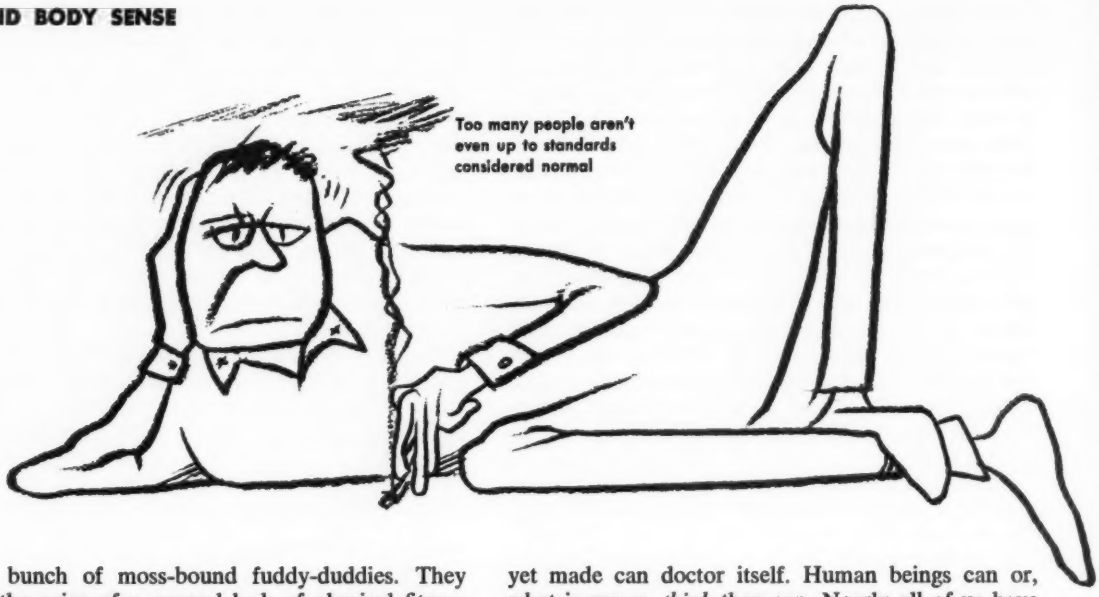
As any draft board in the country can inform you today, the present under-thirty age group isn't exactly in the same shape Julius Caesar would have wanted (and got) for his Roman legionnaires. Above thirty, the situation is even worse. Far too many youngsters appear to think that exercise consists of driving over to a roadside stand for a double burger and a chocolate malted, while Pop gets his muscle toning by sitting in front of a TV set, watching pro football and drinking beer. If they think about the state of their health at all, they figure that if something should *really* go wrong, good old Doc Cureall, the family physician, can reach in his satchel and pull out a magic potion which will set things right for another 20 years or so.

Doc may be good but he is not all that good. When a man has let himself slowly run down like an elderly alarm clock over a long period, getting him back in peak form won't be any overnight job—if it can be done at all.

So there is cause for alarm after all. The health people aren't sounding a warning just because they

the human body (and mind) is an intricate mechanism with which so many things can go wrong that something almost always is out of whack . . .

SOUND BODY SENSE



are a bunch of moss-bound fuddy-duddies. They know the price of a general lack of physical fitness is high, both in dollars and cents and loss of efficiency in all departments.

They also know they can keep on warning until the crack of doom without getting anywhere unless the warning is heeded.

FACTS OF LIFE

As a group, Army airmen are healthy, relatively young and well-fed. Stack them up against any trainload of commuters heading home after a hard day at the office and they would come out miles ahead in terms of health.

It's no accident, either. The Army is well aware that any dropoff in its airmen's mental or physical state is reflected by a corresponding slump in flying, operational or maintenance proficiency. Any good management man in industry will tell you you can't stay in business and meet the competition if your personnel are walking around like a bunch of zombies, as droopy as a May Day daisy chain. Aggressiveness is the word, the kind of spirit which makes a man charge on the field and fight for dear old Siwash until the last whistle is blown.

This calls for human being maintenance at the same level of competence necessary to keep a helicopter functioning at top efficiency, so the Army pays good wages to assorted medical personnel, psychologists and chaplains to ensure that everybody is kept in good working order as large a part of the time as possible.

But there is a very large rub involved. No aircraft yet made can doctor itself. Human beings can or, what is worse, *think* they can. Nearly all of us have our medicine cabinets loaded with assorted pills, salves and other store-bought "remedies" no doctor in his right mind would prescribe for a sick chihuahua. A dollop of Old Indian Swamp Root Extract probably can't hurt you, but it isn't going to do you much good, either, not if there is anything seriously wrong.

Knowing when to look for expert help and when not to is the first step in a sound personal program aimed at peak physical and mental health. It comes down to a man leveling with himself whenever he feels physically off or mentally upset, and asking himself the key question: *Am I in shape to carry out my job without running a risk to myself or others?*

IF THE ANSWER IS A FLAT AND HONEST *NO,* THE TIME HAS COME TO DO SOMETHING ABOUT THE SITUATION.

Shrugging it off, going ahead, come hell or high tide, and hoping for the best is about as far from a good solution as you can get. That is the one most of us arrive at all too often. Right there, friends, is one of the explanations for that ominous phrase "human error" which keeps gate-crashing the accident and incident reports.

Like most people in their age group, Army airmen hate to admit they are not up to snuff. A man may be carrying around enough excess blubber to outfit a standard-sized walrus, but if he is *normal,* he keeps telling himself he has only a few extra pounds he can easily get rid of the first time he can get around to it, or by an evening at the bowling alley. Or he has woes and hang-ups which can only be handled by experts

but which he blindfolds himself into thinking can be persuaded to go away all by themselves. Or he goes off to work on days when even his wife knows he should be in bed with a hot water bottle, pending a call by the family doctor. Human error? People in this condition—who won't ask themselves and act on the key question—have about as much business flying an aircraft or handling a torque wrench or even doing paperwork as they would wrestling a Bengal tiger barehanded.

At the other end of the scale are the apprehensive souls who call up poor old Doc at all hours every time they find themselves with a twinge in their little toe or in the grip of a mild hangover. Praise be, the Army hasn't many of them, but any medical man will assure you a person who spends a good deal of his time worrying about the state of his health, switching doctors and dosing himself with home remedies probably really is sick in one way or another. It's also likely that what is wrong isn't what he thinks it is. He wants an answer but he is afraid of what he thinks is the *right* answer.

For the over thirty age group, muscle toning is usually done by sitting in front of the TV set watching pro football and drinking beer . . .

STRAIGHT AND LEVEL

In between these two messy extremes—the people who don't know enough to care and the home remedy-happy hypochondriacs who think up ailments for themselves medical schools haven't even heard of—are the levelheaded Joes who have noted and taken heed of the flood of warnings about the absolute need for physical fitness. They know enough—let's face it, they have guts enough—to ask for help when they are in real trouble. They also are mature enough to set up personal standards which will keep them at peak efficiency most of the time, and out of trouble when some physical or mental circuit beyond their control is temporarily out of kilter.

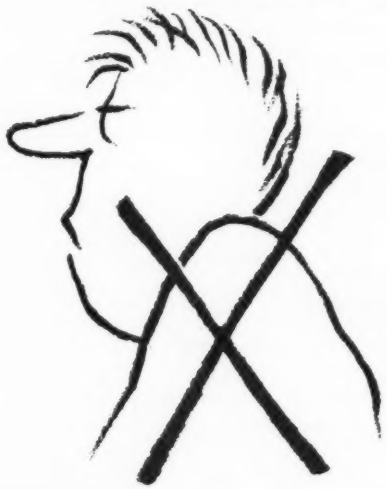
Look, for instance, at the matter of stress. Or tension. Or pressure. Or whatever you want to call it. Whatever it is, it is something everybody is subject to at some time, Army airmen more than most. Flying under the best of conditions requires keen concentration and attention to detail. Maintenance work on aircraft which are urgently needed for operations is equally exacting. And the more the pressure builds up, the more a man's physical and mental reserve tanks are depleted.

Nature has provided three simple ways of refueling the body and mind. Rest, recreation and an adequate diet. That recreation bit doesn't mean a night out on the town with the boys, either. The chap who uses the old saying about all work and no play as an excuse for an extended pub crawl into the early hours isn't building up any reserves. What he is really doing is setting himself up as a sitting duck for a renewed attack by stress when he gets back in the trenches.

Normally, an afternoon on the golf course or a trout stream, a nicely-turned char-broiled steak and some solid sack time is enough to get a man back in good working order. But let's admit that isn't always possible. A unit operating in the field, working at peak load, is pushed to extremes. But, under a wise management program, *not beyond those extremes.* We go back to question No. 1. At some point, when a level-headed man realizes he has reached his absolute limits, he calls a halt and throws in the towel. He refuses to allow false pride to push him on to the point where he falls flat on his face—and, as often as not, drags some other poor soul along with him. A good manager also knows long before, like a good football coach, when to pull a man off the field, or what plays to call.

Proper diet considerably extends the limits. No computer could figure out how many millions of words have been written on the subject. Everybody *does* know that unless you load on enough calories each day— just enough and no more—you are asking

It's the aggressive go-getter you need . . .



not the droopy zombie

You've got to level with yourself

for dire trouble, and yet doctors know to their sorrow that practically everybody has eating habits which would put to shame either (a) a Berkshire hog or (b) a convict trying to get along in solitary on a diet of bread and water.

How often have you gone down to the flight line early in the morning with nothing but a cup of black coffee sloshing around in your stomach? You know by now to appreciate that without a stout breakfast your blood sugar drops off, your efficiency drops lower

A man can be carrying around enough excess blubber to outfit a standard-sized walrus

than the bottom of Death Valley and your resistance to stress is about that of the straw house the big bad wolf huffed and puffed down just before he gobbled up one of the three little pigs. A lot of us do it, just the same.

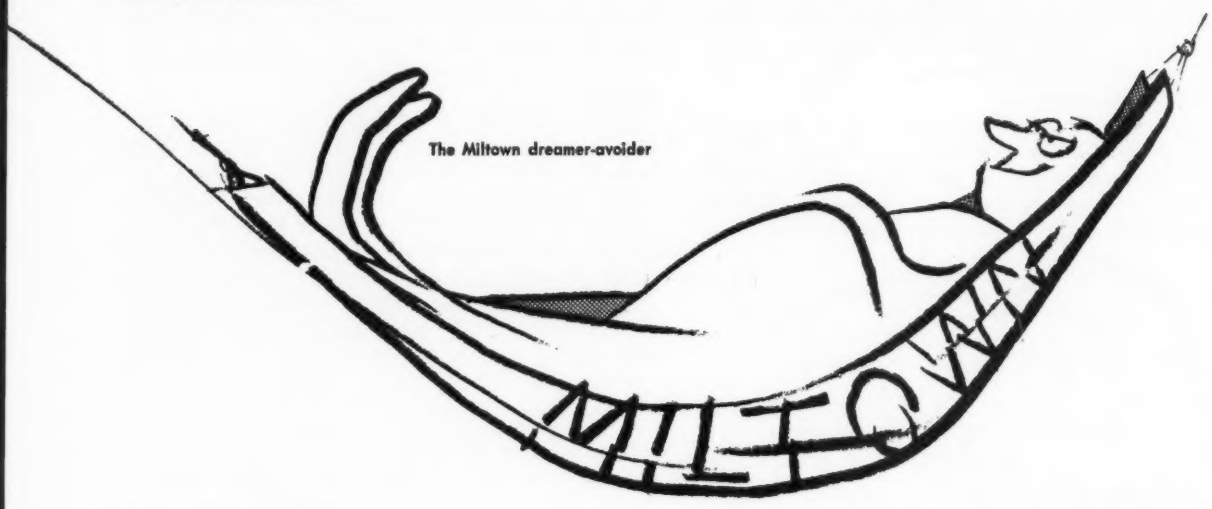
You run into strong arguments from people who maintain they have been getting on splendidly on nothing but black coffee for breakfast for years. There also are the rotund specimens who contend that an extra helping of mashed potatoes is good for the soul and that everybody loves a fat man. Who's kidding whom?

Nobody much is being fooled, including the man who is trying to pull the wool over his own eyes. Every psychiatrist and psychologist knows that if somebody wants to do something badly enough, whether it is good for him or not, he can find all kinds of excuses for going ahead if he lacks the self-discipline which separates men from boys. We all have it to a degree. On a summer day you have two choices. You can head for the beach or you can stay home and paint the porch roof which has been leaking since last March. Care to bet where you will wind up?

When it comes to staying on an even keel and bearing up under pressure, the best defense is a policy of moderation in all things. Sure, everybody is entitled to kick over the traces from time to time, to live it up a little on New Year's Eve and on such occasions as the arrival of a healthy son and heir. The man who doesn't like to celebrate a little from time to time is a very dull thud and human blank cartridge indeed.

It is knowing where to draw the line which counts. You can't expect, as they say, to hoot with the owls at night and soar like Wilbur and Orville with the eagles at dawn, not for very long anyway. You can't underdo it (black coffee and too little sleep) or overdo it (too many cigarettes, too many beers, too many extra helpings of high-calorie whipped-cream delights) and get away with it indefinitely. It's like Russian roulette. The odds may take some time to catch up but catch up they will.

The home remedy-happy hypochondriac



The Miltown dreamer-avoider

ROLLER COASTER

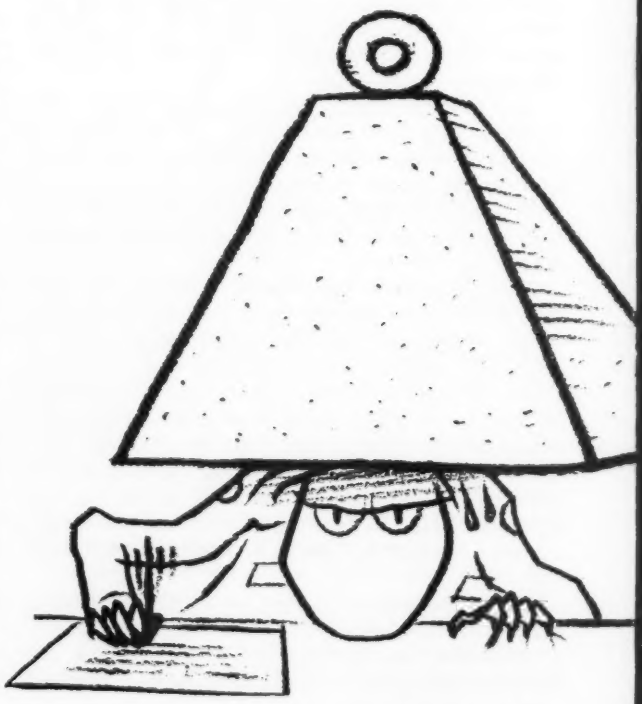
Not even the moderate chap whose way of life is as safe and sane as a game of dominos in an old ladies' home can escape a certain amount of wear and tear. Everybody has days when he is cheerful as a chipmunk, as worry-free as a grasshopper and is so bursting with energy he would be willing to tackle Mount Everest singlehanded.

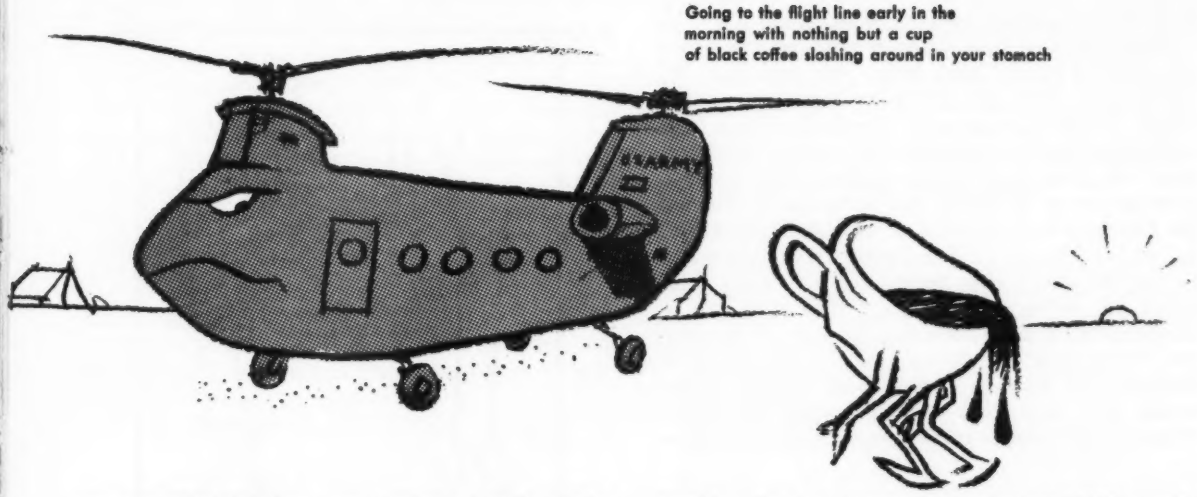
It would be great if we could all be that way all the time. It doesn't work out that way. For no accountable reason we also go through days when our tail rotors are dragging the ground and our spirits are about on the level of those of a man who has just been sentenced to 150 years in the pokey with no time off for good behavior.

Remember, nobody is completely *normal*. Ups and downs of this sort *are* normal, in fact. Nobody but Pollyanna ever has the ups all the time, and when the levelheaded man breaks his shoelaces while dressing, has a minor tiff with his wife at breakfast and realizes this isn't going to be one of his better days, he tightens up his guard against what other dirty tricks Fate is going to play on him before the five o'clock whistle blows.

The mind plays as much of a role in the health picture as the body. Under real stress it can be overwhelmed with worries and anxieties to the point that it gives up the battle and strikes its colors at the exact time it is most needed. Don't get the wrong idea. You don't have to be a hopeless cripple in a wheel chair not to be in the sort of *physical* health you need to do your job in tip-top fashion. You don't have to be locked in a padded cell, trying to convince everybody that you are the reincarnation of Little Bo Peep, not to be in a mental state which has pushed your alertness and judgment indicators over the red line.

Somebody has named the Twentieth Century the Age of Anxiety. All of us these days are a little bit worried about something most of the time. Probably

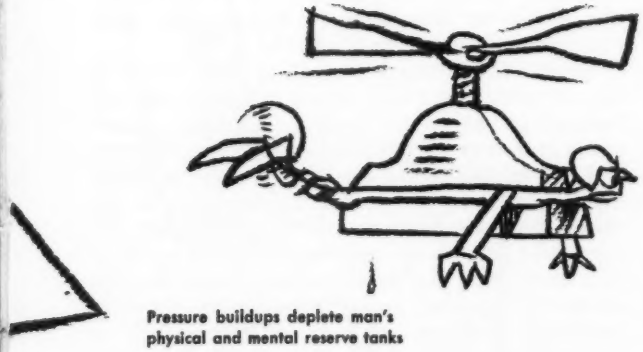




Going to the flight line early in the morning with nothing but a cup of black coffee sloshing around in your stomach

even multimillionaires spend some of their waking hours fretting about whether their bankers, lawyers and servants are robbing them blind. That's all right. That's *normal,* too.

It's the really *big* worry which can gnaw on a man until his usefulness to himself, his family and his profession is seriously impaired. Money. Deep family troubles. In the Army, the occasional hidden and abnormal fear of flight. Grief caused by loss. A broken engagement. Fear that he is not professionally competent. The suspicion that he has some serious and incurable disease. And so on and so on.



Pressure buildups deplete man's physical and mental reserve tanks

Anxiety of this sort can have a very solid basis or it can start from something trivial ("I wonder what the CO was thinking about when I caught him staring at me this morning?") and grow into a three-headed monster which can make the victim wake up in the night with the shakes and the cold sweats. No matter what, it is just as real and just as dangerous as an impacted wisdom tooth or a broken leg. In fact, it has been known for some time that anxiety is a major cause of stomach ulcers and can produce a wide variety of other physical symptoms as well.

For every cause, there's a cure, or almost always. The cure for anxiety, as must be as plain as the nose on the face of the late W. C. Fields, is to get rid of the cause. That isn't always easy, as the mice who set out to hang a bell on the neck of the family cat discovered.

Your levelheaded man doesn't *like* to hunt for help but he accepts the fact that sooner or later he is going to have to. Staying home or trying to do an assigned job while biting the bullet and hoping the pain will go away won't solve anything, and doctors can't be expected to go around from door to door hunting for business the way insurance agents do.

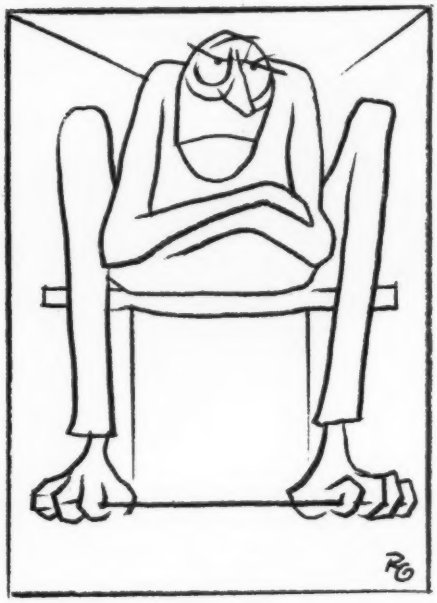
This alarming communications gap is closed only when a man squarely faces the fact that he is carrying a load heavier than both his burly shoulders can carry, overcomes his natural qualms about unloading his troubles on somebody else and hollers for help

in whatever direction seems to be indicated.

Most of us have been raised to mind our own business and let others mind theirs. An ideal state of affairs when all is well. But there come times—*and sooner or later it happens to everybody*—when you can't mind your own business. You need help—from your wife, your doctor, your chaplain, your banker, your lawyer or somebody else competent to handle the problem, be it physical or mental. Going down to Paddy's Bar and Grill and pouring out your woes to Joe, the genial chap behind the bar, won't help you a bit, either. Joe has heard your story and a thousand like it more times than he wants to remember. He can mix an extra-dry martini like nobody's business and what he knows about human nature would fill a book, but you know what Joe does? When he has troubles of his own he hunts up a professional, not another bartender.

Worries, large or small, which you can't get off your mind

The deeper a man gets into trouble, the more likely he is to button up



Human nature being what it is, the deeper a man gets in trouble, the more likely he is to button up. The more he convinces himself he has acquired a disease which will have him pushing up daisies before the year is out (the fact is he pulled a muscle playing handball) the longer he delays a visit to the doctor. The deeper his financial pickle becomes, the more reluctant he is to ask his banker for advice.

Sometimes a little gentle prodding helps. Not long ago, an Army pilot's wife noticed that every time her husband picked up the paper he adopted a scowl which made him resemble the late Humphrey Bogart, and that he was dialing a high percentage of wrong numbers after he had looked up somebody in the phone book. She dialed the *right* number herself and a few days later her husband found himself in a doctor's chair being fitted for reading glasses. He had always thought only sissies wore glasses, but now everybody tells him he looks as distinguished as Senator Barry Goldwater and he doesn't dial wrong numbers any more.

An essential part of any aviation management program is concern for the physical and mental well-being of all hands from top to bottom. It is a shared responsibility. You can't say it is the flight surgeon's job all by himself to keep the troops healthy any more than you can say that the chaplain should guarantee

that each and all will be eventually welcomed at the Pearly Gates (after changing planes at Atlanta).

Suppose a crew chief generally so cheerful he is about to burst at the seams with happiness suddenly becomes morose, withdrawn and ready to snap your head off at a word? Or a mechanic whose work has been next to flawless starts goofing in all directions, mislaying his tools and falling over his own feet? You don't have to be a curbstone philosopher to come to the conclusion that there is a monkey wrench in their mental or physical works and that action is required. You are also not telling tales out of school if you drop a word in the right quarters. To the flight surgeon, for instance, who doesn't have eyes in the back of his head any more than the rest of us do and who has been taught to keep his patients' confidences to himself. The life you save may be your own.

Sound management also includes avoidance of Operation Overpush when it comes to a unit's state of health. *No mission is worth doing if the men can't do it properly.* Good commanders throughout military history have known this. The Duke of Wellington, who beat Napoleon in war's Superbowl, the Battle of Waterloo, made a point of never going into battle unless his troops were well rested and well fed. He knew that missions were performed by men, not guns, and that men have their definite limits.

BASIC TRAINING

For some time now, every cigarette package has borne these ominous words: *Warning: The Surgeon General has determined that cigarette smoking is dangerous to your health.*

Ah, indeed. So you have given up smoking.

You haven't?

Hmmm, again.

SOUND BODY SENSE

If you happen to run across a magazine or newspaper which doesn't have an article about balanced diets, the virtues of jogging as a means of keeping fit or a column dealing in advice to everybody on everything, you can be sure the people in the Smithsonian Institute would like to have it as an exhibit. From all this you could come to the conclusion that as a nation we are remarkably health conscious.

Conscious, maybe, but that doesn't mean we are doing enough about it. We either take fitness for granted or, when trouble hits, we let it go until things get out of hand. Then, when we finally call on poor old Doc to glue us back together, we wonder why it takes him so long and why he always seems to be in such a bad temper.

Health conscious? Look at it this way, friends. At birth you come equipped with (1) a body and (2) a mind. Because you are in Army aviation they have

No mission is worth doing if the men can't do it properly. Good commanders throughout military history have known this . . .

brought you on a good part of the road in fine fashion and if you keep them in good working order they will last you a long lifetime. That's more than you can say for most ballpoint pens.

But if they fail you completely, you sure can't pick up any replacements at the dime store, the way you can a new pen.

Looks as if it is up to you to take care.

Do just that and you'll get by—with the help of your friends.

Mishap Data-Current or Obsolete?

IN VIEW OF the number of requests that the U.S. Army Agency for Aviation Safety (USAAAVS) receives for aircraft mishap data, we decided to explain our current way of bookkeeping and at the same time make some suggestions to you, the requesters, that we hope will help in individual recordkeeping.

Many people request mishap data by fiscal or calendar year periods simply because that seems to be the best way to get field operation data in order to compare two like periods. But there well may be a lapse of several months between the time of the request and the periods covered by the data. In reality, the requester may need more recent data. To meet this need, USAAAVS is now using a "12-month moving" reporting period which means that reports reflect the two immediately preceding 12-month periods, rather than the calendar or fiscal year. For example, the report ending with April 1972 lists cumulative data for the periods May 1971–April 1972 and May 1970–April 1971. In this manner, field operation mishap data up to the last 30–45 days is normally available—data for the period ending 30 April should be reported out by the last of May.

How may this help in personal recordkeeping? We are all aware that some sort of records about flight hours, mishaps, failures, etc., are needed to show whether the aviation safety program is making any headway in a unit. USAAAVS has the same problem, only on a worldwide scale, and we have come up with a format for this 12-month moving report that we have found eminently useful and believe can be easily adapted to the requirements of a unit or a command.

For our example (shown in the table), we have used 12-month data for an airplane and a helicopter from a hypothetical command. We have provided a "recap" column in which data for all the unit aircraft can be totaled. The types of data are generally self-explanatory except perhaps for "mishaps." This generic term, as can be seen from the example, covers accidents, incidents and forced and precautionary landings, thus reflecting the overall aviation activity of the unit. Accidents are categorized as to total loss, major and minor. Rates are determined from the formula $\frac{(X)(100{,}000)}{(\text{no. flying hours})}$ where X equals number of accidents or incidents, etc. Note the ease with which comparisons can be made. In order to keep the report current, it must be brought up to date at the end of each calendar month. We recognize that some work will be required to maintain the report, but the advantages to be gained seem to offset the tedium of keeping it current.

Chief among these advantages is that the responsible people would have current comparative information to back up any recommendations for corrective action they deem necessary. This type of record system also invites the identification of trends as they develop, especially in the area of system failures, and provides the perceptive commander or ASO with a headstart for preventive measures. Not only do problem areas become much more visible, but also the impact of the accident prevention program as the accident and loss rates are adjusted monthly for two similar periods.

You may want to include specific subsystems under system failures, and there are other ways you can modify the format and headings to suit your particular needs. But because this type of data recording system has worked for us, we hope it may be of some assistance to you.

Samuel M. Phillips
Office for Plans and Operations
USAAAVS

TYPE OF DATA	U-21A 12 MO. ENDING APR. 71	U-21A 12 MO. ENDING APR. 72	UH-1H 12 MO. ENDING APR. 71	UH-1H 12 MO. ENDING APR. 72	TOTAL ACFT. 12 MO. ENDING APR. 71	TOTAL ACFT. 12 MO. ENDING APR. 72
1. Flying Hours	39,694	36,377	1,532,280	1,010,488	(Total data for all aircraft in unit)	
2. Mishaps (total)	19	27	1,605	1,803		
a. Accidents	5	1	332	134		
Accident Rate	12.60	2.75	21.67	13.26		
(1) Total Losses	0	1	161	64		
Total Loss Rate	0	2.75	10.51	6.33		
(2) Major	5	0	160	65		
Major Rate	12.60	0	10.44	6.43		
(3) Minor	0	0	11	5		
Minor Rate	0	0	.72	.49		
b. Incidents	3	1	475	262		
Incident Rate	7.56	2.75	31.00	25.93		
c. Forced Landings	1	0	189	94		
Forced Landing Rate	2.52	0	12.33	9.30		
d. Precautionary Lndgs.	10	25	608	591		
Prec. Lndg. Rate	25.19	68.72	39.68	58.49		
3. Total Fatalities	0	0	245	103		
Total Fatalities Rate	0	0	15.99	10.19		
Total Injuries	0	0	452	204		
Total Injuries Rate	0	0	29.50	20.19		
4. Total Cost	$6029	$3495	$531,391	$218,444		
Cost/Flying Hour	15.19	9.61	34.68	21.62		
5. Inflight Fires	0	1	13	10		
Postcrash Fires	1	0	46	16		
6. System Failures (total)			683	362		
Airframe	0	0	45	30		
Alighting Gear	3	4	0	0		
Engine	3	8	399	206		
Main Rotor	0	0	10	4		
Main Transmission	0	0	9	2		
Combining Transmission	0	0	0	0		
Tail Rotor	0	0	6	5		
Tail Rotor Transmission	0	0	17	3		
Prop System	0	0	0	0		
Hydraulics	0	0	154	83		
Instruments	0	1	14	10		
Electrical	0	1	12	8		
Fuel Systems	0	0	3	2		
Flight Controls	0	1	11	8		
Utility Systems	0	0	1	1		
Avionics	0	0	1	0		
Armament	0	0	1	0		
7. Fuel Exhaustion	1	0	7	4		
8. Ejection/Bailout	0	0	0	0		

I'VE WAITED 7 long years to prove my point and now I'm going to show them! I've been telling Washington all this time that I need new equipment if they expect me to react promptly. When we had those riots in Johnsontown 3 years ago, I knew we had to have it. What about that flood upstate last year? We had to go outside the state for help. Things will be different from now on!"

The general, addressing his staff on their upcoming 2-week summer encampment, had definite ideas he wanted transformed into action. "We have 25 brand new UH–1s. COL Legg, I want your troops trained in airmobile operations and I want it done fast."

COL Legg shifted uneasily in his chair. He tried

THAT GREAT LEAP FORWARD

The general had definite ideas he wanted transformed into action . . .

Lieutenant Colonel William N. Insley
Education and Prevention Department, USAAAVS

to formulate a plan that would allow time for his brigade to be ready for 2 weeks of airmobile training. If he worked it out just right, he decided, he could make it. He might have to drop all other training for a couple of months, but if he concentrated on airmobile training, he could just make it. "Yes, sir," he replied, "can do!"

The general turned his attention to his aviation officer at the other end of the table. "COL Wing, I'll expect maximum availability during those two weeks and I want you to support COL Legg 100 percent! Those aircraft are all new and I won't be looking for excuses." He paused. "By the way, I'll need one for a C&C ship during camp. I'll pick my own pilot, Wing." The general concluded the meeting, "If there are no questions, gentlemen, you're excused."

While this situation is fictional, it is, unfortunately, possible. "But," you say, "no general would ever issue orders like that!" True, if he's well informed. But what if he's uninformed? Our description of the one-way meeting illustrates some of the many management problems our reserve components are going to face this summer. With the advent of new aircraft in numbers from both factory and rebuild facilities, our fellow soldiers in the Army Reserve and Army National Guard are finally going to have firstline equipment to work with. The cry of "Hallelujah!" has been heard. Our hearts are with the dedicated men and women who have performed so well with antiques during recent years. But we also feel a creepy crawler at the base of our spines, sending shivers up our backs. It's not that we're skeptical. It's that age-old problem—"haste makes waste"—lurking in the background.

Let's examine the general's meeting a little closer. His desire to conduct airmobile training for the troops is legitimate and will most certainly benefit mission accomplishment. The first obvious problem is time. COL Legg is already calculating his time available with the idea that something has to give. Does it? Is it absolutely essential that *everyone* be airmobile trained by the end of this first encampment with new equipment, or should a system of priorities be developed for units to be trained as time permits?

Time will further affect the quality of the training to be given. If large groups of men must be trained all at once, how effective is that training going to be? One of the greatest problems facing COL Legg is *Who? Who* will he have to conduct this training? He knows that he recently recruited several Vietnam veterans who participated in airmobile operations, but is that the way it should be done? He's heard many rumors about the way they often threw the book away in Vietnam. Perhaps he'd better stick to FMs and TMs. COL Legg must decide whether his "Can do!" was accurate or whether he should have said "We'll begin."

How about COL Wing? Does he also have problems? His guidance was direct enough—"Give COL Legg 100 percent support . . . no excuses." The aircraft are new, so that shouldn't be a problem, he thinks. This is true until his maintenance officer mentions such things as *programed maintenance* and the inadvisability of flying all out until they're all out—of aircraft. So he can set an availability rate and schedule his maintenance, say 85 percent ready for missions, not counting the general's aircraft. If he does that, he'll be peeling his maintenance officer off the ceiling in 3 days. He *must* establish realistic levels tailored to his men's ability to work on the new aircraft and parts availability.

COL Wing's operations involve some other interesting problem areas. More than half of his aviators have less than 50 hours in UH–1s. Sixty-five percent have expired instrument standard or tactical tickets and several haven't been to instrument school at all. The last time anyone flew formation was when they picked up that last group of aircraft. And the loose trail they flew wasn't exactly formation flying. His pilots haven't flown any heavy loads and COL Wing is well aware of what density altitudes can be at Camp Swampy. He still has five pilots to check out in the UH–1. But that can be done, more easily if he could get a couple of school quotas before camp.

Maybe COL Wing should consider pilot training more important than airmobile training and make appropriate recommendations. These may not sit well with the general, but they could save lives and machines. If this problem was approached with tact and factual information, the general could be convinced. The same holds true about the general picking his pilot. If his choice isn't the best available, the general should be so advised and efforts should be made to bring the general's choice up to par while the best available pilot flies the general.

Most of the management problems indicated in this article are simple ones, caused by lack of training, time or communications. Each, within itself, is not complex and can be solved. However, when a systematic approach to everyday operations is neglected and sufficient time for planning and execution are not allowed, all concerned will suffer unplanned events or mishaps. If we take one step at a time and do it together, then a *prepared* COL Wing can meet a *prepared* COL Legg for 100 percent support and that great leap forward.

HOW'S YOUR CIRCADIAN RHYTHM?

While disrupted circadian rhythm is rarely more thn a passing nuisance to the victim, it is a real potential threat to aviation unit commanders

SAY, Mr. Overseas Aviation Unit Commander, how's the circadian rhythm in your unit? Lest there be a misunderstanding, let's make it clear from the beginning that circadian rhythm IS NOT a form of birth control.

Simply defined, circadian rhythm is the metabolic pattern of daily physiological activity—eating, sleeping, waste elimination, etc. From these, a sense of well-being and intellectual awareness springs. The term itself is derived from the Latin *circa diem,* meaning "about the day."

Until the advent of jet transport, problems with circadian rhythm were extremely rare. The pace of transport in propeller aircraft or surface transport was slow enough to enable the body to adapt, albeit sometimes slowly, to large time zone changes.

But with the start of the jet age, crews and passengers of jets began to experience discomfort and distress after traveling long distances through many time zones in a brief span of time. What these travelers experienced was a disruption of their circadian rhythms. Their "metabolic clocks" were not able to adapt as rapidly as they could be transported. Disrupted circadian rhythm was the first true jet age malady.

The largest single group to become victims of disrupted circadian rhythm were jet crews who began reporting a baffling variety of minor ills and complaints. Chief among these were mild mental confusion, insomnia or sleepiness, various waste elimination problems and lack of appetite. While the physiological distress and mental confusion are very real (so real in fact that many major corporations have a standing rule that executives will not make major decisions until 48 hours after jetting to some distant country), they generally disappear within a week or two. There are rare occasions when the symptoms produced are severe enough to warrant medical treatment. It has been reliably reported that a prominent news correspondent, known for frequent, far-flung jet trips, went into partial retirement as a result of a chronic insomnia acquired through continual disruption of his circadian rhythm.

To the Army aviation unit commander located half a world away from CONUS, disruptions of individual circadian rhythms among his command by home leaves or emergency leaves pose a real op-

Major William F. Gabella
Technical Research and Applications Department
USAAAVS

erational hazard to his unit. Despite outward physical appearance, the returnee or "newbie"—whichever the case may be—can be expected to experience some malaise and fatigue and subsequent impairment of judgment and flying skill due to "dislocation" of circadian rhythm.

While most aviation units in Vietnam and Korea make considerable allowances for newly assigned air crew personnel, the same safety considerations are not usually given to the "old hands" returning from distant R&R or leaves—whose circadian rhythms have been disrupted just as radically. Also, the "newbie's" plight is somewhat different than that of the "old hand." Like as not, the "newbie" usually won't even get near the flight line for a week or so, until he has completed in-country and unit processing and orientation.

Conversely, many unit commanders expect the returning "old hand" to start flying the day after his return. This is especially true if the unit is short-handed or if the returnee is highly skilled and experienced, i.e., a standardization instructor pilot, instrument examiner, etc.

To this writer's knowledge, only one aviation unit in Vietnam was sufficiently aware of circadian rhythm problems to incorporate safeguards in the unit's operational SOP. Their rule was that returnees from CONUS would not be scheduled to fly earlier than 48 hours after their return. Returnees from a Hawaiian R&R were given 24 hours of grace before being posted to fly.

No firm rule for returnees from purely Far Eastern R&R sites was made by the unit. The reason for this was that the unit was aware of a study conducted by the airlines which showed east-west travel, across time zones, disrupted circadian rhythm more drastically than travel in a north-south direction, parallel to time zones.

While disrupted circadian rhythm is rarely more than a passing nuisance to the victim, it is a real potential operational threat to the aviation unit commander—especially in combat. The wise aviation unit commander should take steps, via the medium of his operational SOP and unit safety meetings, to identify and eliminate the threat of disrupted circadian rhythm.

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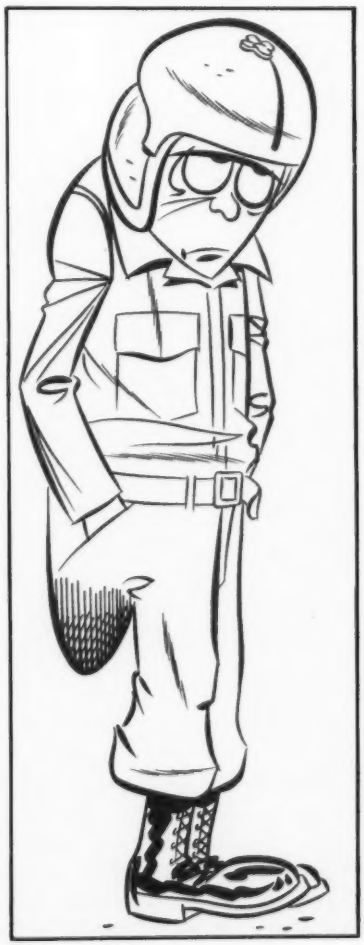
Major William F. Gabella
Technical Research and Applications Department
USAAAVS



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If you have a question about personal equipment or rescue/survival gear, write Pearl, USAAAVS, Ft. Rucker, AL 36360

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

NEW LIGHT

NO, PEARL hasn't found a magic wand. The glowing object in her hands is an emergency light/marker, consisting of a flexible transparent sealed tube (lightstick) housing two liquids, one contained in a glass ampule. Flexing the lightstick to break the enclosed ampule allows the two liquids to unite, causing a chemical reaction which instantly produces a bright yellow-green light, closely resembling the flashing light emitted by fireflies. The light is intense enough to read by and radiates in all directions.

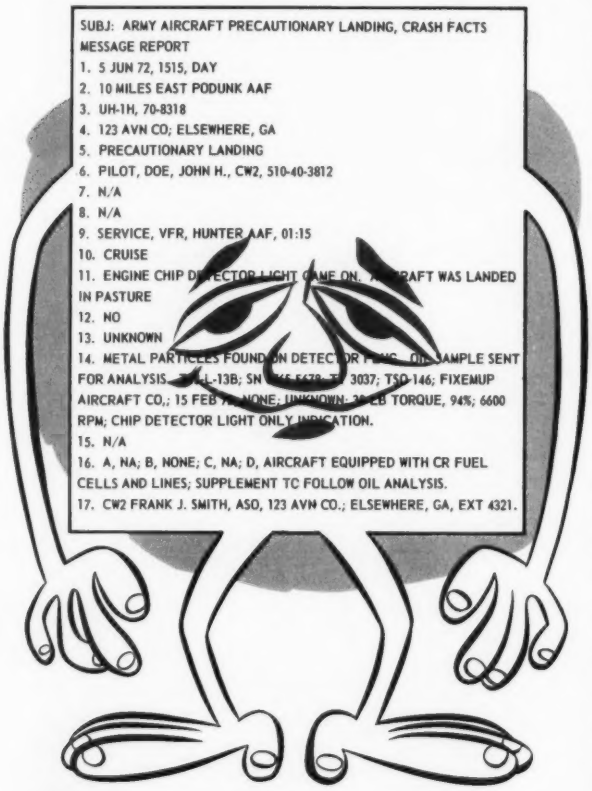
It is a convenient, safe and reliable low intensity light source. It does not produce flame or heat, does not emit fumes, nor does it depend on electrical current or radioactivity to function. It may be safely used in explosive atmospheres and is equally effective in wind, rain and under water. Should the chemical components leak from the tough polyolefin tube and come in contact with the skin, washing affected areas with soap and water can prevent irritation, according to instructions issued with the light. If the liquid gets into the eyes, they should be washed with copious quantities of water. The toxicity of the chemicals is said to be similar to that of vinegar.

The uses for these lightsticks are many and varied. They have been used by other military services in search and rescue missions to mark the locations of rescuers, victims, landing areas, drop zones and pick-up points. They have also been used for signaling, mapreading and directing traffic in emergencies. There are literally hundreds of other emergency and routine applications for them in mines, boats, automobiles, homes, campsites, etc.

Additional features include a shelf life of more than 5 years, an ability to float on water, and light weight (each lightstick weighs less than three-fourths of an ounce). Different types are available, producing yellow, orange or green lights of varying intensity and duration. Although the instructions state that the particular lightstick Pearl is holding will provide light for 3 hours, it will actually continue to glow with a useful output of light for up to 12 hours after activation.

We don't know at this time if the Army will have a requirement for these lights in the near future. Consequently, we can provide no military source of supply. Judging from Pearl's appearance, she seems to be saying, "Cool! Real cool!"

SFC Reginald A. Mullinax
Aircraft Accident Analysis & Investigation Dept.
USAAAVS


SUBJ: ARMY AIRCRAFT PRECAUTIONARY LANDING, CRASH FACTS MESSAGE REPORT
1. 5 JUN 72, 1515, DAY
2. 10 MILES EAST PODUNK AAF
3. UH-1H, 70-8318
4. 123 AVN CO; ELSEWHERE, GA
5. PRECAUTIONARY LANDING
6. PILOT, DOE, JOHN H., CW2, 510-40-3812
7. N/A
8. N/A
9. SERVICE, VFR, HUNTER AAF, 01:15
10. CRUISE
11. ENGINE CHIP DETECTOR LIGHT CAME ON. AIRCRAFT WAS LANDED IN PASTURE
12. NO
13. UNKNOWN
14. METAL PARTICLES FOUND ON DETECTOR PLUG. OIL SAMPLE SENT FOR ANALYSIS. T-53-L-13B; SN [illegible] F478; TT 3037; TSO 146; FIXEMUP AIRCRAFT CO,; 15 FEB 72; NONE; UNKNOWN; 20 LB TORQUE, 94%; 6600 RPM; CHIP DETECTOR LIGHT ONLY INDICATION.
15. N/A
16. A, NA; B, NONE; C, NA; D, AIRCRAFT EQUIPPED WITH CR FUEL CELLS AND LINES; SUPPLEMENT TC FOLLOW OIL ANALYSIS.
17. CW2 FRANK J. SMITH, ASO, 123 AVN CO.; ELSEWHERE, GA, EXT 4321.

The Art of Breeding Crash Facts Messages

CRASH FACTS messages are unplanned—a hybrid species unintentionally conceived of questionable lineage. While the father may come from many breeds—crews, maintenance, materiel, supervision, weather, etc.—the mother is normally Homo sapien, and defying all laws of nature, may be either male or female. Crash facts messages are, by regulation (AR 385–40), rapidly produced, requiring a maximum of 8 duty hours from conception to birth. Due to this brief gestation period, it is extremely important that the embryo be nurtured and protected if it is to become healthy and useful. Improper care during this stage can lead to the development of a defective and prolific strain which reproduces itself in exact form and pattern. This strain, in turn, may result in mutations, unhealthy and useless to the safety program, which develop from minor mishaps into catastrophic accidents. Defective crash facts messages which omit vital information concerning cause factors deter effective preventive measures.

Unlike other infants, crash facts messages have no natural protection during the embryonic stage. Instead, they are nurtured and developed openly by the hands of their originators. For this reason, great care and attention to details must be exercised to prevent undesirable characteristics.

Mature and properly developed crash facts messages have proven extremely useful in the hands of aviation developmental and safety personnel. Messages have been successfully used to combat such enemies as the mythical gremlin, human error, design faults, publication errors, improper maintenance procedures, etc., and a task force of crash facts messages is waging a continuing war in an attempt to repeal Murphy's Law. Following are some examples:

During development of an improved crashworthy fuel system for UH–1 helicopters, it became apparent that a special strain of crash facts messages was required in the form of additional information. Consequently, all prospective originators were notified to include this information in future messages. It is noteworthy that the second crash facts message to be bred from this requirement reported a large amount of fuel had drained from the fuel vent line of an inverted aircraft. Immediate action was taken to install crashworthy fuel vent lines. Work on this program is presently continuing. The originator of this crash facts message should be proud. Thanks to this particular strain of messages, there have been no thermal injuries or fatalities in survivable mishaps because catastrophic postcrash fires have, so far, been prevented by the fuel containment features of the crashworthy fuel system.

In late 1971 and early 1972, many crash facts messages were spawned, reporting low transmission

ARMY AIRCRAFT ACCIDENT CRASH FACTS MESSAGE REPORT RCS CSGPA-459			
1. DATE, TIME (LCL)		DAWN DAY DUSK NIGHT	
2. AIR MILE DISTANCE	DIRECTION (FROM)		
3. ACFT TYPE, MODEL, SERIES	SERIAL NO.		
4. UNIT ASSIGNED	HOME STATION		
5. CLAS	DESCRIPTION OF DAMAGE		
		EST OF DAMAGE	
6. OP DY	FULL NAME	RANK	SSN/SN
UNIT ASSIGNED	HOME STATION	INJ/CAUSE	EJEC YES NO
7. CREW MEMBER: DY	FULL NAME	RANK	SSN/SN
UNIT ASSIGNED	HOME STATION	INJ/CAUSE	EJEC YES NO
8. PASSENGER: DY	FULL NAME	RANK	SSN/SN
UNIT ASSIGNED	HOME STATION	INJ/CAUSE	EJEC YES NO
9. MISSION	TYPE CLEARANCE	DESTINATION	TIME IN FLIGHT
10. PHASE OF OPERATION	LANDING TAKEOFF IN FLIGHT HOVER/TAXI		
11. DESCRIPTION			
12. WEATHER A FACTOR	WHY		
13. MAINT OR INSP ERROR			
14. a. MATERIEL DEFICIENCY (KNOWN/SUSPECTED)		b. EIR CONTROL NO.	
c. FSN	d. PART NO.	e. NOMENCLATURE	
f. PUBLICATION	g. ENG MODEL & SERIES	h. ENG SERIAL NO.	
i. TOTAL TIME	j. TIME SINCE O/H	k. O/H FACILITY	
l. DATE OF O/H	m. STORAGE HISTORY	n. CAUSE OF FAILURE	
o. POWER SETTING	p. SIG ENG IND		
15. OTHER PERSONNEL CONTRIBUTING TO MISHAP a. NAME		POSITION	
b. INJURIES YES NO DEGREE		c. DAMAGE TO GOV'T OR CIVIL PROPERTY	
16. ADD INFO IAW AR 95-30 a. DATE FAA NOTIFIED		VIOLATION OF REGULATIONS (MIL OR CIVIL) b. YES NO	
c. CLASSIFIED MATERIAL ON BOARD (FOR MISSING ACFT ONLY)		YES NO	
d. ACFT EQUIPPED WITH CRASH RESISTANT FUEL CELLS/FUEL LINES		YES NO	
e. OTHER PERTINENT INFO			
17. PERSON TO CONTACT FOR ADDITIONAL INFORMATION			

oil pressure and loss of transmission oil. These greatly aroused the curiosity of recipients at USAAAVS. Eventually, a message was received which indicated that the cause for these complaints was failure of the internal oil filter gasket in the UH–1 and AH–1 main transmissions. Further investigation revealed this particular strain of messages came from common parents—technical manual omissions and improper maintenance procedures. The TM failed to stipulate that a gasket should never be reused. Since it wasn't in the book, maintenance personnel were reinstalling the same gaskets over and over. Corrective actions evolving from this strain of messages included changes in technical manuals and widespread notification about the problem. Also, a new and stronger gasket has been designed.

Since crash facts messages are often regarded to be of questionable parentage, stigmas are sometimes attached to their birth. This encourages concealment and mishaps which should be reported are not, or the crash facts messages distort the true facts. However, the instructions in AR 385–40 are explicit about the procedures to be followed during conception, gestation and the dispatch of birth announcements. These instructions should be followed to the letter. It is obvious from the case histories listed that messages spawned in one area are beneficial to units worldwide. They are also essential to such organizations as the U.S. Army Aviation Systems Command, National Guard Bureau, Office of the Assistant Chief of Staff for Force Development, U.S. Army Materiel Command and Office of the Chief of Army Reserve. Copies are also furnished to the safety offices of the Air Force and Navy to aid in their programs on like equipment.

The chart shown was prepared to help breeders obtain good skeletal structure and anatomical development of crash facts messages. Items one through nine form the basic skeletal structure. Any omissions or distortions of this information can seriously hamper the value of the message.

Let's skip down to items 15 through 17. These outline the basic data bank of a crash facts message. Since the message can not reason, it was necessary to program a certain degree of intelligence into it. Great study was required to accomplish this, and when it was discovered that the data retention factor of crash facts messages was somewhat limited, only those items deemed to be the most important were included. Remember, only accurate information must be used.

Suppose we stop here—what do we have? We have an intelligent skeleton, of limited use. Let's think of items 10 through 14 as the muscles and sinews of a message. It is in this area that so many breeders fail. These items often do not receive the development and consideration their nature demands because of the extremely short gestation period. Yet, it is through the proper development and use of these genetic building blocks that many crash facts messages have contributed to aviation safety. Here, more than in any other area, the breeder should strive to eliminate all undesirable characteristics and to fully exploit desirable ones.

A crash facts message must be classified in accordance with section II, chapter 1, AR 385–40, which provides the criteria for classification into the categories of major, minor, incident, forced landing, precautionary landing and other. A review of requirements listed will reveal that all such messages can be classified into one of these categories with no provision for nonclassification.

The persons to be notified and methods of notification authorized are listed in chapter 4 of AR 385–40. The listing is extensive and varies by classification of the message. The number of addressees and their positions should indicate to the breeder the importance of proper preparation of each message prior to dispatch. This list should also make breeders hesitant to conceal the birth of mishaps. Just imagine the embarrassment if one of the addressees should discover a concealed birth.

During the period FY 1958–FY1971, USAAAVS recorded more than 50,000 mishaps and placed them in the data bank where they still serve, called on regularly to provide information for many studies and reports. Some of the more important research areas in which crash facts messages are currently used are those dealing with wire strikes, midair collisions, crashworthy fuel systems, terrain collisions, special mishaps, combat survivability, fire detection systems, emergency egress systems, tail rotor hubs, turbine engine discs and many others.

Now that you, as breeders, know the importance of carefully nurtured crash facts messages, may we wish you few but healthy children.

William S. Angle
This article was written by the author while attending the USAAAVS Aviation Accident Prevention Course

THE WORD

WHY IS IT that one unit does so well in safety while another continues to be plagued with accidents? It can be stated simply in one word. This word is the most important word you or I or any ASO will ever develop. You must develop its use before you or your program of accident prevention can progress positively toward your goal of zero accidents. This most important word in safety, as well as any other endeavor, is ATTITUDE.

Let's face the facts honestly. We shape our own safety records. If our attitude is poor, our safety record is lousy. If our attitude is lukewarm, our record is still terrible. Unless we have a positive, progressive *can-do attitude,* we are not in the top 5 percent of successful ASOs. Facts prove that if we think we may not be able to do something, chances are that we will not. Dr. Walter Dale Scott said, "The success or failure of any endeavor is caused more by mental attitude than by mental capacity."

Do you realize you can alter your unit's entire safety record by your attitude? For some strange reason, 95 percent of all men tend to minimize their importance. They think the other man always has the best luck or the best opportunity to accomplish a goal. They sit and wait for opportunity to find them and, at the same time, they resist changes. Continual changes are the things in this life about which you can be absolutely certain. Welcome changes as new opportunities.

When you find a unit doing an outstanding job with an outstanding safety record, you will find an ASO with the right *attitude*. Not only will the ASO have the right attitude, but he will have a positive influence on the attitudes of the commander, the pilots, the mechanics and all others who play roles in successful operations.

Following are 10 points which can help you build the proper *attitude* and automatically put yourself in the top 5 percent of the leaders in the ASO field:

1. It is our *attitude* at the beginning of a task, more than anything else, that will affect its outcome.
2. It is our *attitude* toward life which determines life's *attitude* toward us.
3. We are interdependent. It is impossible to succeed without others and it is our *attitude* toward others that will determine their *attitude* toward us.
4. Before a person can achieve the kind of success he wants, he must become that kind of individual. He must think, walk, talk, act and conduct himself in all of his affairs as the person he wants to be.
5. The higher you go in any organization, the better the *attitude* you will find. Men with better *attitudes* just naturally gravitate toward the top.
6. Your mind can process only one thought at a time. Since nothing worthy is ever accomplished with negative thoughts, make all of your thoughts positive.
7. The deepest craving of human beings is to be needed, to feel important, to be appreciated. Give them these qualities and they will return them to you.
8. Look for the best in new ideas. You will never meet a person you cannot learn something from.
9. Radiate the attitude of well-being, of confidence, of a person who knows where he is going. This will inspire those around you and you will find that good things will start happening to you.
10. For the next 30 days, treat everyone with whom you come in contact as the most important person on earth. If you will do this for 30 days, you will do it for life.

Now that you know you can influence your unit for better or worse, which is it going to be?

Insignia

I have been following with interest the recent series of letters on the Nomex flight uniform and the type of insignia (pin-on or sew-on) that should be worn with it. Much of the discussion so far has centered around whether the insignia should be flame retardant.

There is another safety aspect of the pin-on versus sew-on insignia controversy that I believe is important, and that is FOD to engines from pin-on metal insignia that have been known to fall from a uniform into an engine. This is a real problem and should not be overlooked.—CW2

You are right—engine FOD is a definite problem that has resulted from pin-on metal insignia. As we noted in FORUM in the March AVIATION DIGEST, the only type of insignia of rank authorized for use by enlisted personnel on fatigue and Nomex uniforms is pin-on metal. In addition, metal rank, metal distinctive unit badges and metal special skill badges are the only insignia authorized on fatigue caps. USAAAVS considers any metal insignia on a flight uniform, even a uniform worn by those being transported in an Army aircraft, to be a potential hazard from two aspects. In a mishap sequence, the metal insignia can injure the individual (lacerations, eye damage) or become entangled with the restraint system, communication cords or other material of the aircraft. The latter obviously would impede speedy egress from the aircraft. Secondly, these insignia present the potential for accidental ingestion by turbine engines, as well as jamming vital controls or control surfaces.

The use of sew-on cloth insignia on a Nomex flight suit or other fatigue uniform creates no significant hazard from any viewpoint, including that of postcrash or in-flight fire. (Be sure to read the next letter in this column.) Cloth material of the insignia is no more flammable than that of standard fatigue or old flight suit material. Indeed, the second layer of cloth provided by the insignia on an ordinary uniform actually provides increased protection. On the Nomex flight suit, the overall protective benefit of the Nomex material is not significantly degraded. If the Nomex uniform is worn correctly, with the collar turned up, the rank insignia would be on the skin side of the Nomex, would be protected from fire, and would actually help by its second layer value to protect the small area of the face and neck which it covers.

For these reasons, USAAAVS does not recommend the use of pin-on insignia on any flight suit. Sew-on cloth insignia do not present a significant fire hazard problem and are to be preferred for use on all flight suits, including Nomex.

Nomex Flight Suit

In the March 1972 issue of the AVIATION DIGEST I read with interest the concern expressed over the use of the non-flame-resistant name tags and insignia worn on some of the aviation units' flight suits. Having had a bit of experience with burns, that of being medevaced from Vietnam for extensive third degree burns to my right arm, hand, shoulder, face and head, plus having spent 14 months as a patient in Brooke General Hospital, Ft. Sam Houston, TX, and considering the fact I have another projected several years of minor plastic surgery before me, I feel confident I can express an opinion on the subject. My injuries were sustained when my OH–6A scout ship came under hostile fire while conducting aerial reconnaissance with the 101st Airborne Di-

AVIATION ACCIDENT PREVENTION FORUM

an interchange of ideas between readers and USAAAVS on subjects of aviation accident prevention

vision in December 1970.

From seeing numerous burn cases, plus my own experiences, I have come to the conclusion that the cotton name tags would have very little effect to a burn casualty, and if the incident was so severe as to burn through the name tag, the man would most probably be burned alive and nothing less than asbestos undershorts would save his life. One case in point was a patient admitted with deep third degree burns to his arms from a flash explosion, while sustaining negative injuries to his chest even though all he was wearing was a T-shirt at the time of the fire!

I am certainly not advocating the substitution of T-shirts and shorts for Nomex flight suits and gloves, which very definitely saved my life, but rather trying to point out the fact that the cotton name tags and insignia would probably help protect in a small way, as opposed to the aiding of the fire. Also, when an individual is wearing his insignia on his flight suit, it helps people like me to recognize whether or not I'm approaching a senior NCO, crusty CW3 or a full bull, which certainly helps prevent me from encountering some embarrassing situations and ruining my attitude for the remainder of the day. Whereas the small plastic leather name plates do an excellent job of disguising the rank to the last critical moment. Also, I'm proud of my rank, branch and combat unit and have no inhibitions to the fact of freely displaying all three.

If the Army decides to come out with flame resistant insignia, excellent. But if not, I would prefer the use of the full insignia for each flight suit, as opposed to the small name plates for identification purposes, as I see very little concern needed for the flame resistance problem.—CPT

Stock Numbers

I have been unable to locate stock numbers for several survival type items, i.e., battery for AN/URC–4 radio, strobe light battery, penguins, knife and mirror. If you could provide these, it would be a great help.—CPT, ASO

The stock numbers you asked for are:

6135–073–8939 LS
Battery, mercury (strobe light battery)
6135–295–0608
Battery, AN/URC–4
1370–921–6172
Signal Kit, personnel, red (red penguins)
1370–926–9387
Signal Kit, personnel, colors (mixed-color penguins)
7340–098–4327
Knife, hunting, sheathed (see SB 700–50, Expendable Items)
7350–261–9722
Mirror, emergency signalling

Broken Wing Award

In the March 1972 issue of the AVIATION DIGEST, there appeared a writeup on Captain William E. Bolling titled "Broken Wing Award." This article stated: "Once safely on the ground, it was determined that a clogged fuel filter had caused the power loss. Instantly, CPT Bolling took manual control of the throttle and skillfully flew the aircraft out of the hazardous area." How is this possible? It is not; there was an oversight of what actually happened. The fuel filter was changed prior to departure and going to manual control was not necessary.

Survival Radios

Currently in USAREUR AN/URC–10 survival radios are authorized, but AN/URC–4 survival radios have been issued. Radios containing tubes and batteries are not available. Why can't either AN/URC–10s or AN/URC-68s be procured for use in USAREUR? —CW2

The Army currently has no Standard "A" survival radio, and the AN/URC–10 you refer to is a Standard "B" radio, currently being maintained in the United States and used in Southeast Asia. The AN/URC–68 radio was never type classified for Army use. Both the URC–10 and the URC–68 radios are producing problems in the field, and if the –4 radios assigned to your unit are still operational, it is highly recommended that no action be taken to turn in these radios to obtain newer equipment.

The battery shortage is being remedied. Battery BA 1315 (FSN 7135–295–0608) replaces BA1264. No batteries are on hand in depot, but a contract has been awarded with a due-in date to depot of May 1972. If you have a valid due-out requirement for the battery, you can expect delivery to begin in July or August.

Readers are invited to participate in this forum.
Send your ideas, comments and recommendations to Commanding Officer, USAAAVS, ATTN: E&P Department, Ft. Rucker, AL 36360

USAASO Sez

The U. S. Army Aeronautical Services Office discusses

National Airspace System: The National Airspace System (NAS) includes the facilities, equipment, regulations, procedures and personnel required for the safe and efficient movement of aircraft through U. S. controlled airspace. The Federal Aviation Administration (FAA) is placing major emphasis on automation of the existing air traffic control (ATC) subsystems which, when implemented, will make automated air traffic control services available from takeoff to landing, whenever such services are warranted.

Present manual air route traffic control system. **The current ATC method relies heavily on the skill and dedication of human air traffic controllers, who use radar for aircraft surveillance and sequencing, and voice communications for communicating with pilots. The lack of precise, automatic and explicit information either in the aircraft or on the ground necessitates substantial human intervention that results in heavy workloads for both pilot and controller.**

Planned automated air route traffic control system. **The NAS Enroute Stage A plan links various computers which act as an aid and provide the controller with the information needed for the efficient and safe movement of aircraft through controlled airspace, eliminating the requirement for controllers and pilots to spend considerable time exchanging information via air/ground radio. The potential for position errors is virtually eliminated and the pilot/controller workload is greatly reduced.**

Evolutionary approach. **In order to avoid disrupting services presently provided or derogating safety, implementation of this automated system is being accomplished in well planned evolutionary steps. The first of these steps is called NAS Enroute Stage A, which is designed to significantly automate air route traffic control centers (ARTCCS). The broad objectives of NAS Enroute Stage A are to increase traffic handling capability, improve on an already strong safety record and promote better and faster service to all aircraft by providing:**

- **Automated procedures for easy transfer and accurate processing and updating of flight information.**
- **Automated aids for establishing and maintaining radar identification of aircraft in the system.**
- **Automated display of altitude flight level information along with aircraft position.**
- **A computer processing capability to serve as the basis for future addition of automated improvements in ATC.**

Implementation of NAS Enroute Stage A. **Full Stage A operation will be accomplished in two phases. The first phase will be the installation of IBM 9020 computers and computer updating equipment at all air route traffic control centers. ARTCCs will thereby be provided a flight data processing (FDP) system which will provide an automation capability to:**

- **Accept and store flight plans.**
- **Print and distribute flight plan information.**
- **Calculate and update flight data.**
- **Transfer this data both within the facility and to adjacent facilities.**

The second phase will be the installation of radar digitizers at long range radar sites so that radar data will be brought directly into the centers. The digitized radar display arrangement will provide aircraft data on the controller's display using Alpha numerics to show altitude, beacon code and other information about a target on a radar display. This second phase of NAS Stage A will provide:

- **Automatic aircraft tracking.**
- **Visual flight information displayed upon the controller's radar scopes.**
- **Automatic radar handoff capabilities.**

TAKE A GOOD LOOK

at the man
most likely to
prevent or cause
your accident

WHICH WILL IT BE?

THE AERIAL evacuation of PFC Gene Thaxton from a battalion aid station to a mobile Army surgical hospital (MASH) was notable to the press in 1952 because he was the 10,000th casualty to be evacuated by helicopter during the Korean War. Although a routine mission to the aviation/medical team involved, this milestone was a true measure of the helicopter's success in its short history of evacuating combat casualties.

Over the intervening years the organization, operational techniques and equipment dedicated to the aeromed mission have been vastly improved. The thousands of battle casualties evacuated from combat areas in the Republic of Vietnam to the immediate care of medical personnel are living proof of the extreme importance of the aeromed mission on the field of battle.

While we can be justly proud of past accomplishments in this area, there is yet an important objective in this field to be achieved. This objective is an international agreement to protect medical personnel, ambulances and aerial vehicles that are dedicated to the collection and treatment of sick and wounded whether friendly or enemy. History cites many occasions in past conflicts where opposing commanders agreed to short truces to clear the battlefield of their wounded and dead. Although enemies, these humane acts were strictly honored. This is a note from history that the civilized nations of the world should heed for the sake of all humanity. An international agreement to protect medical personnel, recovery vehicles and battle casualties is not beyond the realm of possibility [see "That They May Live," page 4]. This is a requirement all of us as Americans should support and, where possible, provide the effort and influence to assist establishing such an agreement.

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